

## CHAPTER 4

### POINT AND NONPOINT SOURCE CHARACTERIZATION OF THE UPPER DUCK RIVER WATERSHED

#### 4.1 Background.

#### 4.2. Characterization of HUC-10 Subwatersheds

4.2.A. 0604000201 (Duck River)

4.2.B. 0604000202 (Garrison Fork)

4.2.C. 0604000203 (Duck River)

4.2.D. 0604000204 (North Fork Creek)

4.2.E. 0604000205 (Duck River)

4.2.F. 0604000206 (Rock Creek)

4.2.G. 0604000207 (Silver Creek)

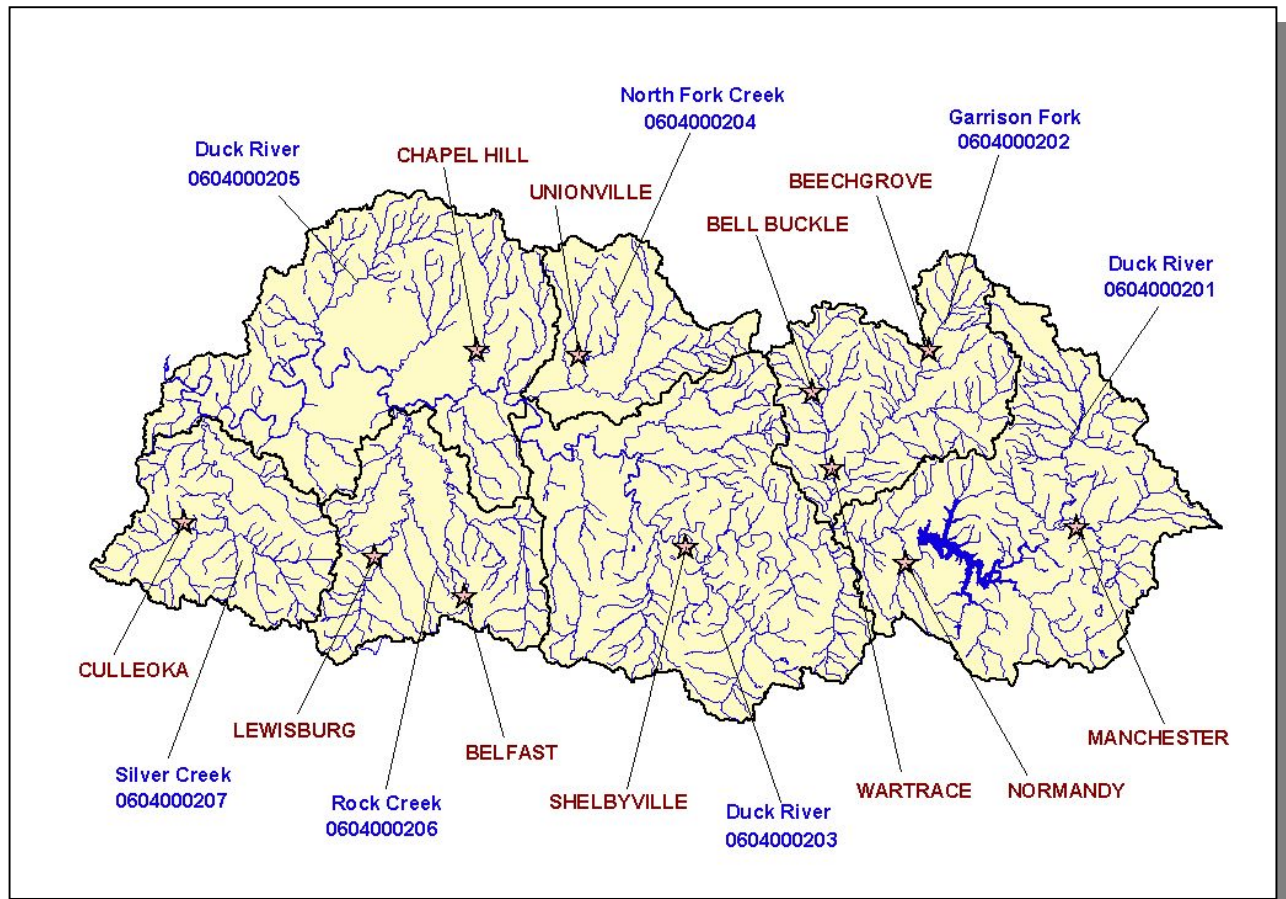
**4.1. BACKGROUND.** This chapter is organized by HUC-10 subwatershed, and the description of each subwatershed is divided into four parts:

- i. General description of the subwatershed
- ii. Description of point source contributions
- ii.a. Description of facilities discharging to water bodies listed on the 2002 303(d) list
- iii. Description of nonpoint source contributions

The Upper Duck River Watershed (HUC 06040002) has been delineated into seven HUC 10-digit subwatersheds.

Information for this chapter was obtained from databases maintained by the Division of Water Pollution Control or provided in the WCS (Watershed Characterization System) data set. The WCS used was version 2.0 (developed by Tetra Tech, Inc for EPA Region 4) released in 2003.

WCS integrates with ArcView® v3.x and Spatial Analyst® v1.1 to analyze user-delineated (sub)watersheds based on hydrologically connected water bodies. Reports are generated by integrating WCS with Microsoft® Word. Land Use/Land Cover information from 1992 MRLC (Multi-Resolution Land Cover) data are calculated based on the proportion of county-based land use/land cover in user-delineated (sub)watersheds. Nonpoint source data in WCS are based on agricultural census data collected 1992–1998; nonpoint source data were reviewed by Tennessee NRCS staff.



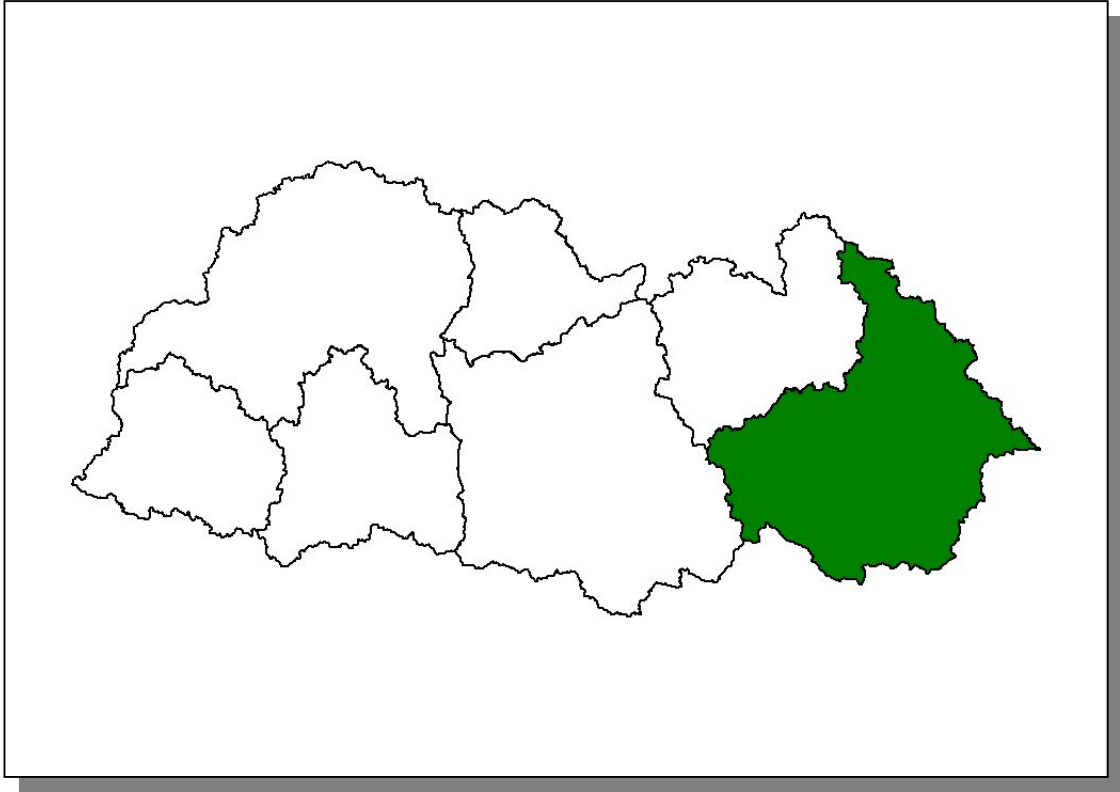
**Figure 4-1. The Upper Duck River Watershed is Composed of Seven USGS-Delineated Subwatersheds (10-Digit Subwatersheds).** Locations of Beech Grove, Belfast, Bell Buckle, Chapel, Hill, Culleoka, Lewisburg, Manchester, Normandy, Shelbyville, Unionville, and Wartrace are shown for reference.

**4.2. CHARACTERIZATION OF HUC-10 SUBWATERSHEDS.** The Watershed Characterization System (WCS) software and data sets provided by EPA Region IV were used to characterize each subwatershed in the Upper Duck River Watershed.

| HUC-10     | HUC-12                                |                                     |
|------------|---------------------------------------|-------------------------------------|
| 0604000201 | 060400020101 (Duck River)             | 060400020105 (Duck River)           |
|            | 060400020102 (Wolf Creek)             | 060400020106 (Norman Creek)         |
|            | 060400020103 (Normandy Lake)          | 060400020107 (Shipman Creek)        |
|            | 060400020104 (Crumpton Creek)         |                                     |
|            |                                       |                                     |
| 0604000202 | 060400020201 (Garrison Fork)          | 060400020203 (Wartrace Creek)       |
|            | 060400020202 (Noah Creek)             |                                     |
|            |                                       |                                     |
| 0604000203 | 060400020301 (Duck River)             | 060400020306 (Duck River)           |
|            | 060400020302 (Thompson Creek)         | 060400020307 (Little Sinking Creek) |
|            | 060400020303 (Little Flat Creek)      | 060400020308 (Fall Creek)           |
|            | 060400020304 (Flat Creek)             | 060400020309 (Sinking Creek)        |
|            | 060400020305 (Sugar Creek)            |                                     |
|            |                                       |                                     |
| 0604000204 | 060400020401 (Upper North Fork Creek) | 060400020404 (Weakley Creek)        |
|            | 060400020402 (Alexander Creek)        | 060400020405 (Clem Creek)           |
|            | 060400020403 (Lower North Fork Creek) |                                     |
|            |                                       |                                     |
| 0604000205 | 060400020501 (Duck River)             | 060400020505 (Duck River)           |
|            | 060400020502 (Wilson Creek)           | 060400020506 (Flat Creek)           |
|            | 060400020503 (Spring Creek)           | 060400020507 (Duck River)           |
|            | 060400020504 (Caney Creek)            |                                     |
|            |                                       |                                     |
| 0604000206 | 060400020601 (Big Rock Creek)         | 060400020602 (Rock Creek)           |
|            |                                       |                                     |
| 0604000207 | 060400020701 (Globe Creek)            | 060400020703 (Silver Creek)         |
|            | 060400020702 (Fountain Creek)         |                                     |

**Table 4-1. HUC-12 Drainage Areas are Nested Within HUC-10 Drainages.** NRCS worked with USGS to delineate the HUC-10 and HUC-12 drainage boundaries.

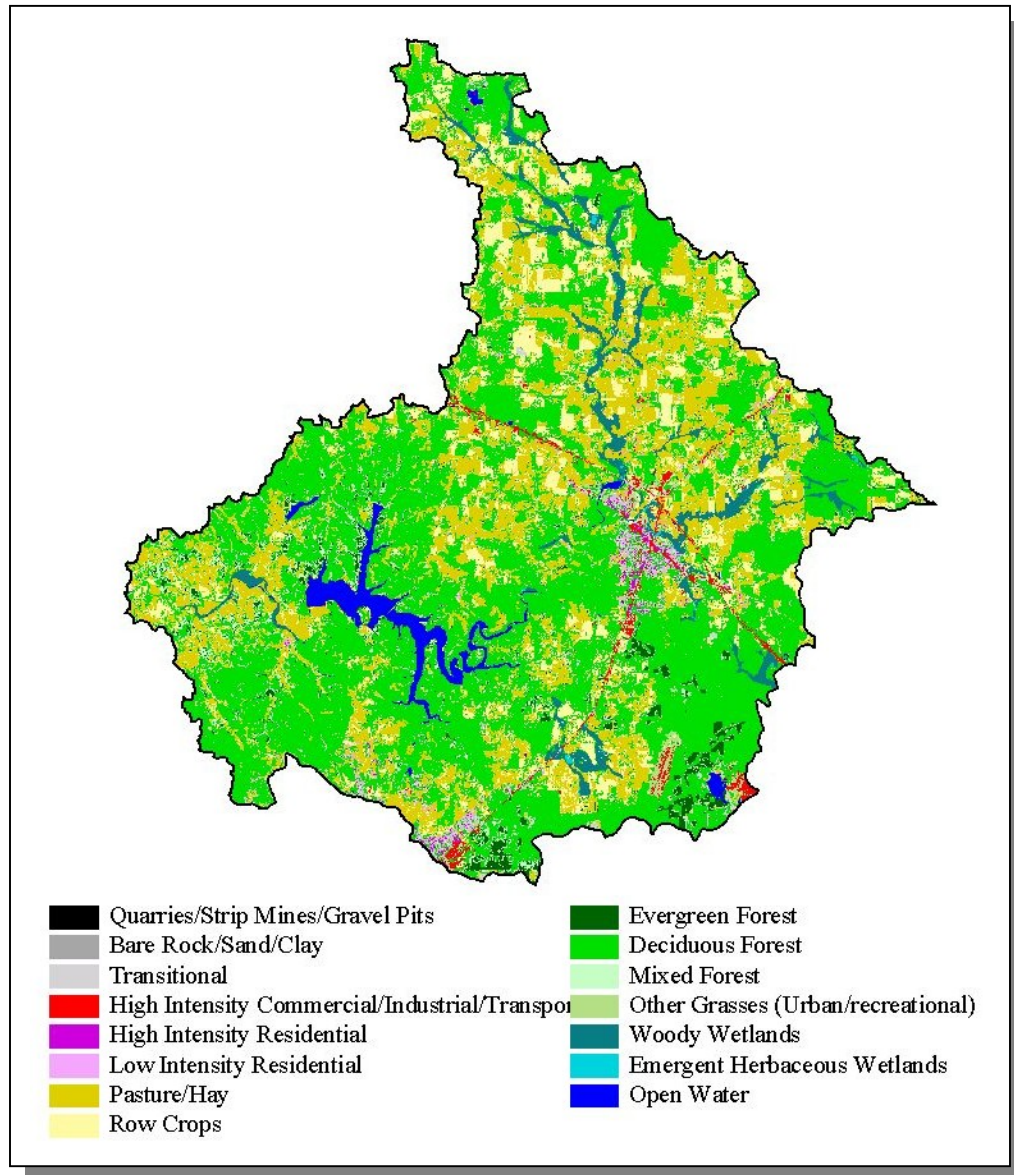
**4.2.A. 0604000201 (Duck River).**



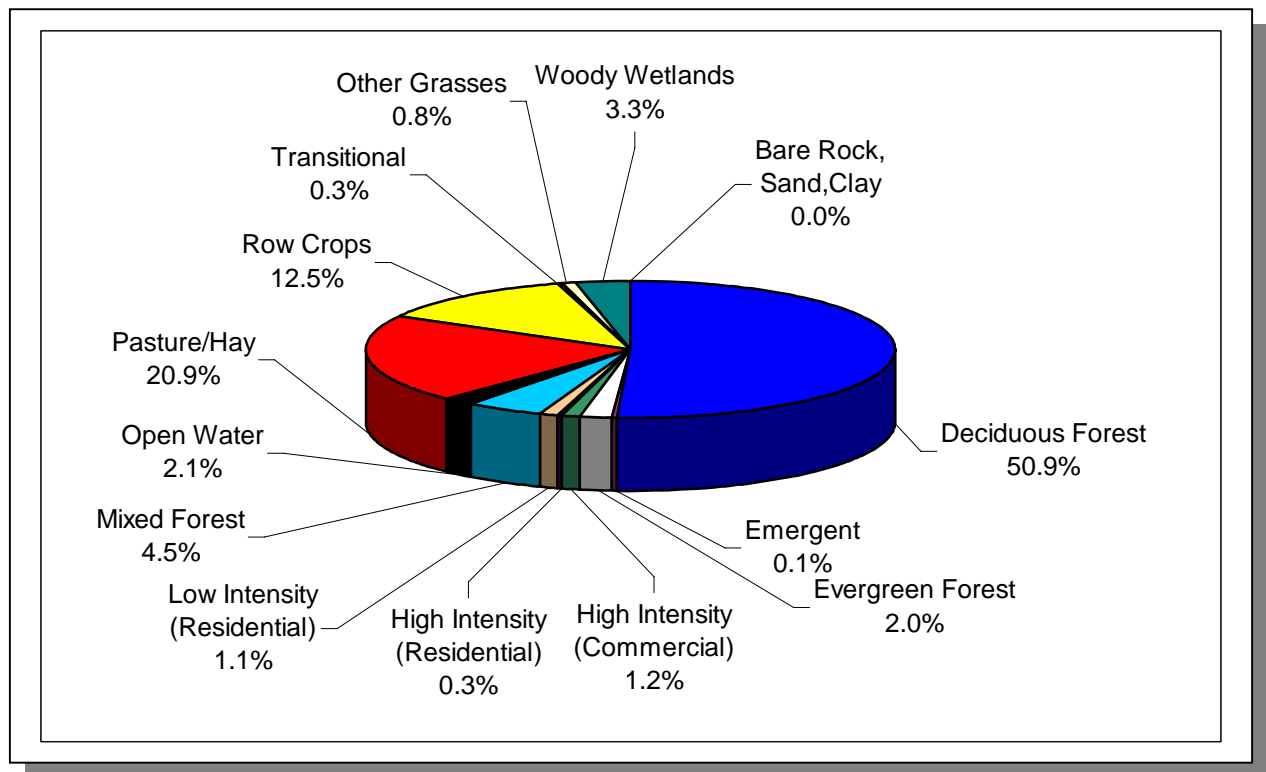
**Figure 4-2. Location of Subwatershed 0604000201.** All Upper Duck HUC-10 subwatershed boundaries are shown for reference.



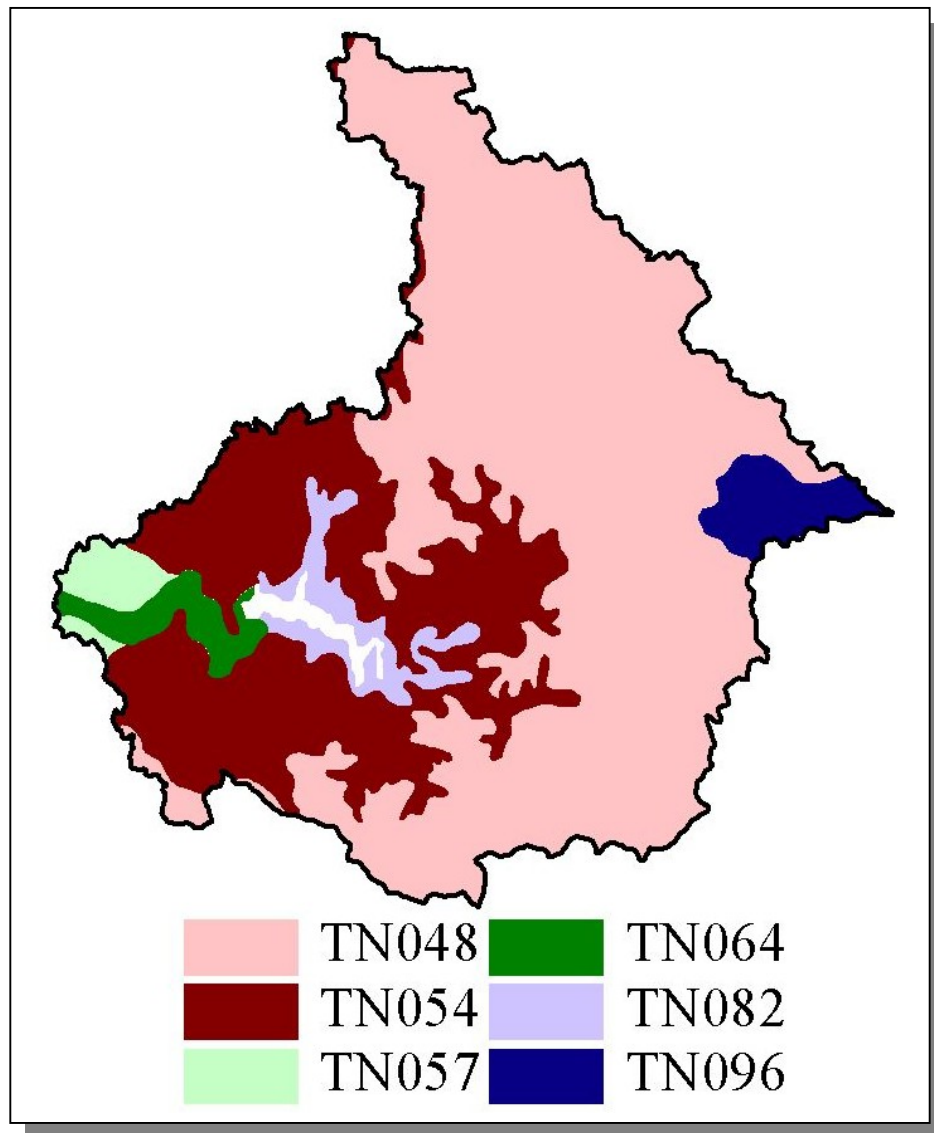
**4.2.A.i. General Description.**



**Figure 4-3. Illustration of Land Use Distribution in Subwatershed 0604000201.**



**Figure 4-4. Land Use Distribution in Subwatershed 0604000201.** More information is provided in Appendix IV.



**Figure 4-5. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0604000201.**

| STATSGO<br>MAP UNIT ID | PERCENT<br>HYDRIC | HYDROLOGIC<br>GROUP | PERMEABILITY<br>(in/hour) | SOIL<br>pH | ESTIMATED<br>SOIL TEXTURE | SOIL<br>ERODIBILITY |
|------------------------|-------------------|---------------------|---------------------------|------------|---------------------------|---------------------|
| TN048                  | 8.00              | C                   | 1.38                      | 5.06       | Silty Loam                | 0.42                |
| TN054                  | 0.00              | C                   | 3.04                      | 4.84       | Loam                      | 0.32                |
| TN057                  | 0.00              | C                   | 1.14                      | 5.01       | Clayey Loam               | 0.33                |
| TN064                  | 7.00              | C                   | 1.19                      | 5.82       | Silty Loam                | 0.37                |
| TN082                  | 0.00              | B                   | 1.63                      | 5.47       | Loam                      | 0.34                |
| TN096                  | 10.00             | C                   | 1.22                      | 5.16       | Silty Loam                | 0.38                |

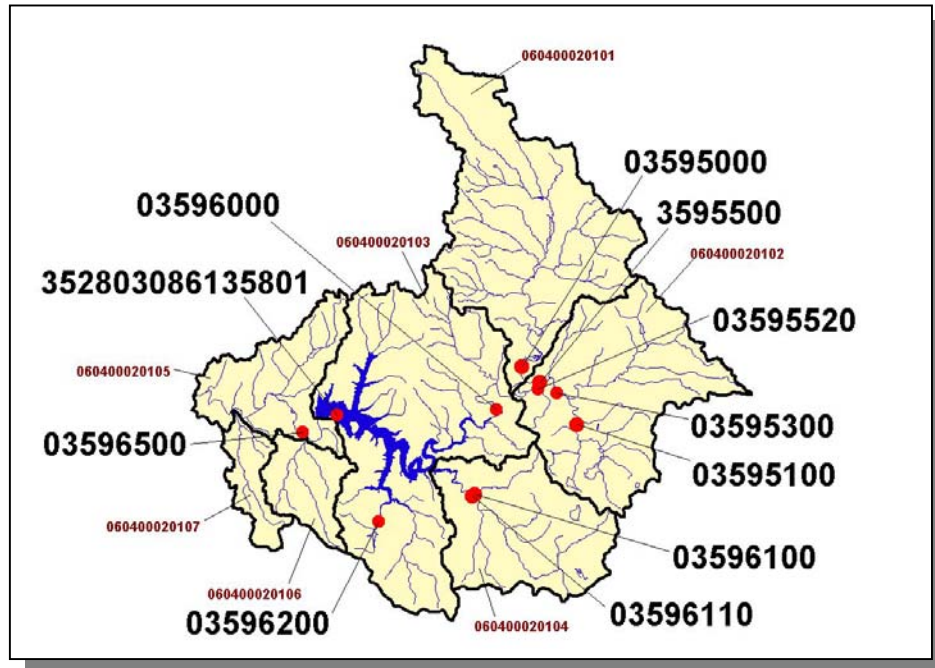
**Table 4-2. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0604000201.** More details are provided in Appendix IV.

| County        | COUNTY POPULATION |                |                | Portion of Watershed (%) | ESTIMATED POPULATION IN WATERSHED |               |               | % Change (1990-1997) |
|---------------|-------------------|----------------|----------------|--------------------------|-----------------------------------|---------------|---------------|----------------------|
|               | 1990              | 1997           | 2000           |                          | 1990                              | 1997          | 2000          |                      |
| Bedford       | 30,411            | 34,203         | 37,586         | 5.99                     | 1,821                             | 2,048         | 2,250         | 23.6                 |
| Coffee        | 40,339            | 45,347         | 48,014         | 47.17                    | 19,028                            | 21,391        | 22,649        | 19.0                 |
| Franklin      | 34,275            | 37,152         | 39,270         | 0.22                     | 76                                | 81            | 86            | 13.2                 |
| Moore         | 4,721             | 5,205          | 5,740          | 2.14                     | 101                               | 111           | 123           | 21.8                 |
| <b>Totals</b> | <b>110,196</b>    | <b>121,907</b> | <b>130,610</b> |                          | <b>21,026</b>                     | <b>23,631</b> | <b>25,108</b> | <b>19.4</b>          |

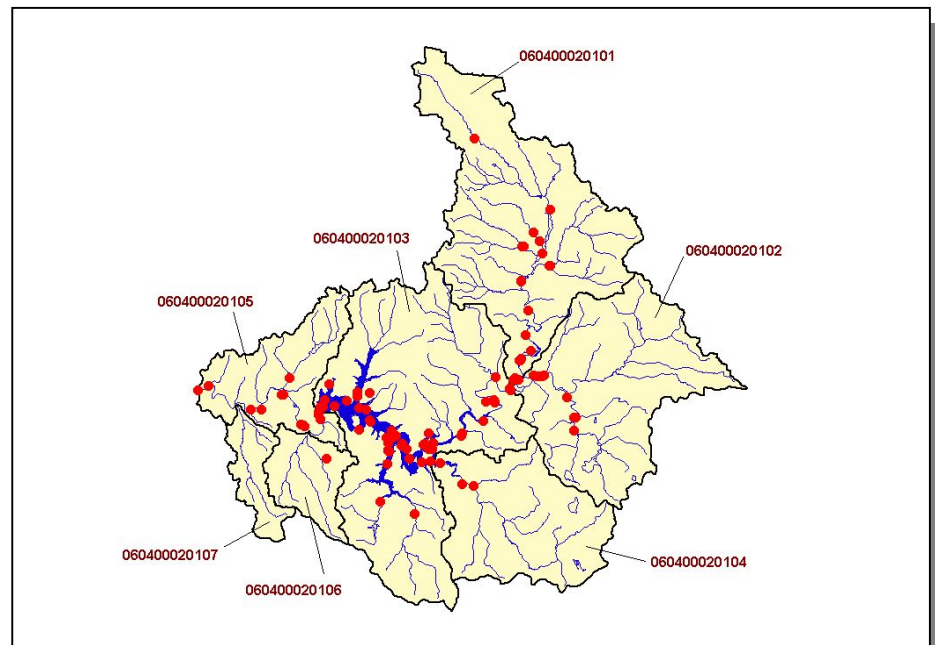
*Table 4-3. Population Estimates in Subwatershed 0604000201.*

| Populated Place | County  | Population    | NUMBER OF HOUSING UNITS |              |              |           |
|-----------------|---------|---------------|-------------------------|--------------|--------------|-----------|
|                 |         |               | Total                   | Public Sewer | Septic Tank  | Other     |
| Manchester      | Coffee  | 7,709         | 3,330                   | 2,925        | 384          | 21        |
| Normandy        | Bedford | 135           | 54                      | 0            | 54           | 0         |
| Tullahoma       | Coffee  | 16,757        | 7,109                   | 6,184        | 920          | 5         |
| <b>Totals</b>   |         | <b>24,601</b> | <b>1,0493</b>           | <b>9,109</b> | <b>1,358</b> | <b>26</b> |

*Table 4-4. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 0604000201.*

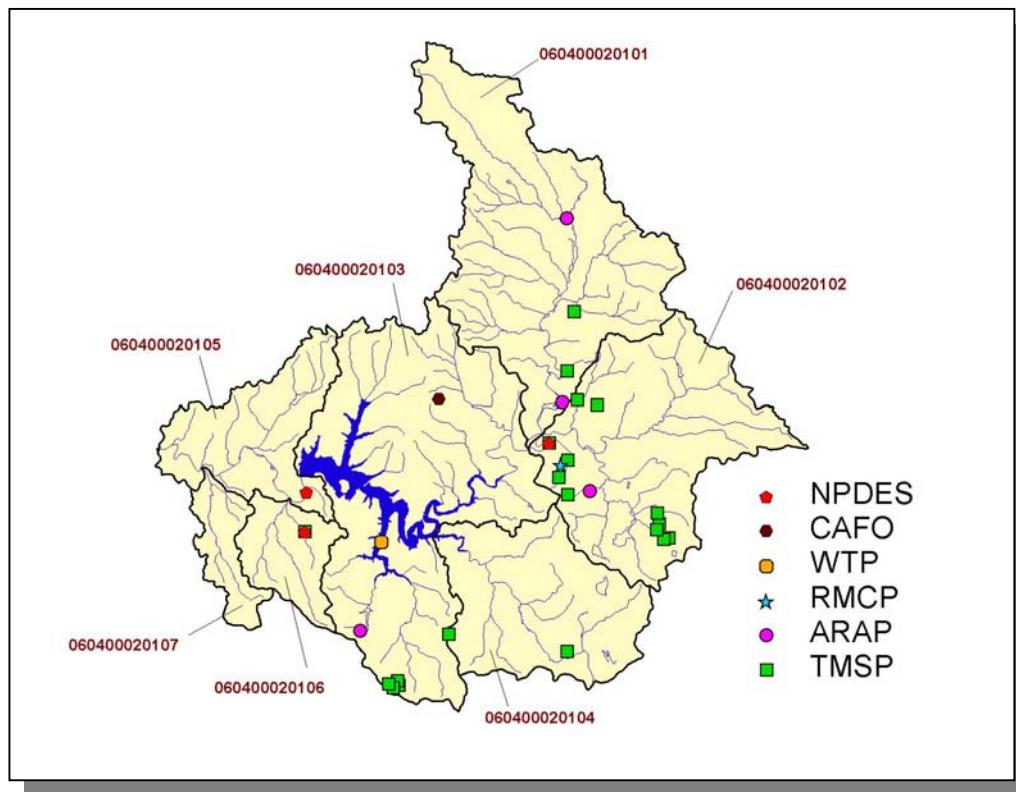


**Figure 4-6. Location of Historical Streamflow Data Collection Sites in Subwatershed 0604000201.** Subwatershed 060400020101, 060400020102, 060400020103, 060400020104, 060400020105, 060400020106, and 060400020107 boundaries are shown for reference. More information is provided in Appendix IV.



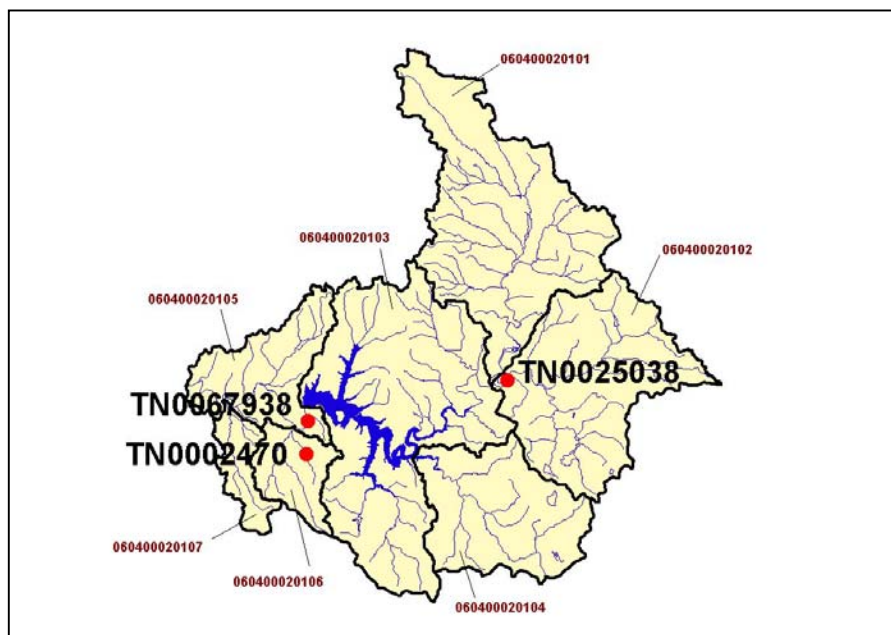
**Figure 4-7. Location of STORET Monitoring Sites in Subwatershed 0604000201.** Subwatershed 060400020101, 060400020102, 060400020103, 060400020104, 060400020105, 060400020106, and 060400020107 boundaries are shown for reference. More information, including site names and locations, is provided in Appendix IV.

4.2.A.ii Point Source Contributions.

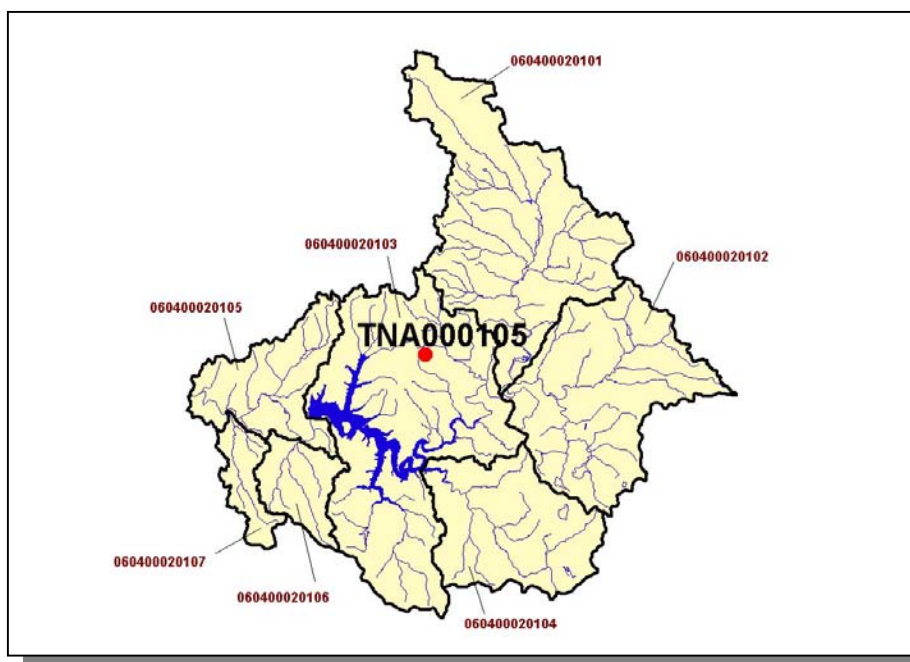


**Figure 4-8. Location of Active Point Source Facilities in Subwatershed 0604000201.** Subwatershed 060400020101, 060400020102, 060400020103, 060400020104, 060400020105, 060400020106, and 060400020107 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.



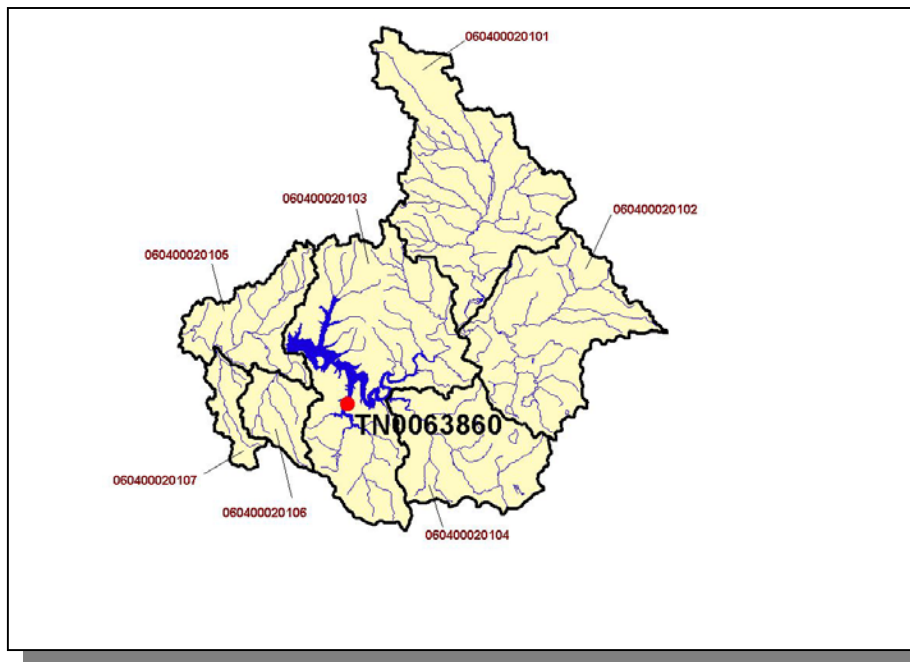


**Figure 4-9. Location of NPDES Facilities in Subwatershed 0604000201.** Subwatershed 060400020101, 060400020102, 060400020103, 060400020104, 060400020105, 060400020106, and 060400020107 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.

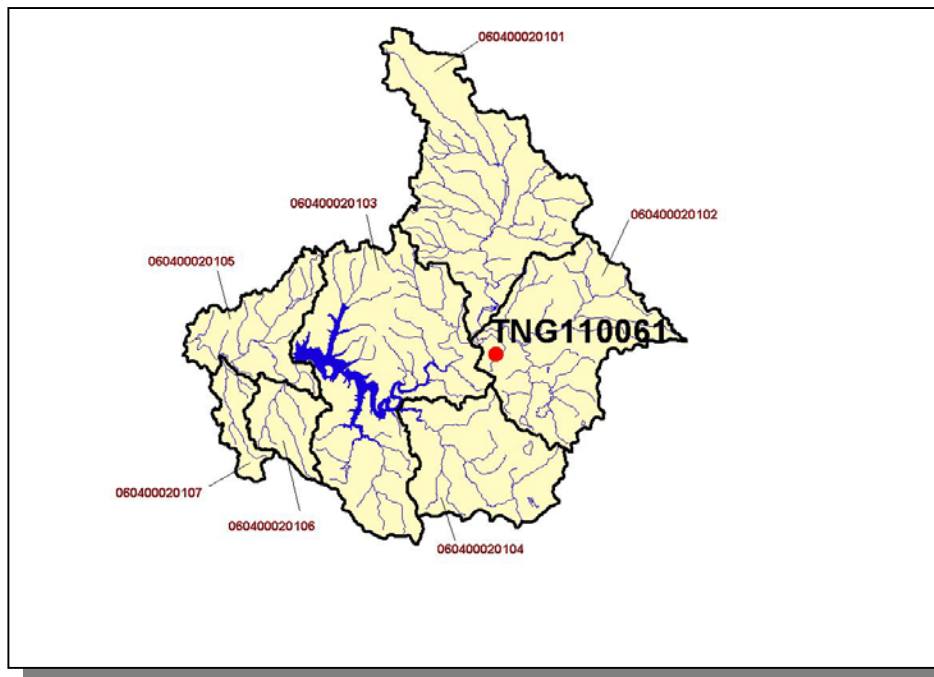


**Figure 4-10. Location of Concentrated Animal Feeding Operations (CAFO) in Subwatershed 0604000201.** Subwatershed 060400020101, 060400020102, 060400020103, 060400020104, 060400020105, 060400020106, and 060400020107 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.

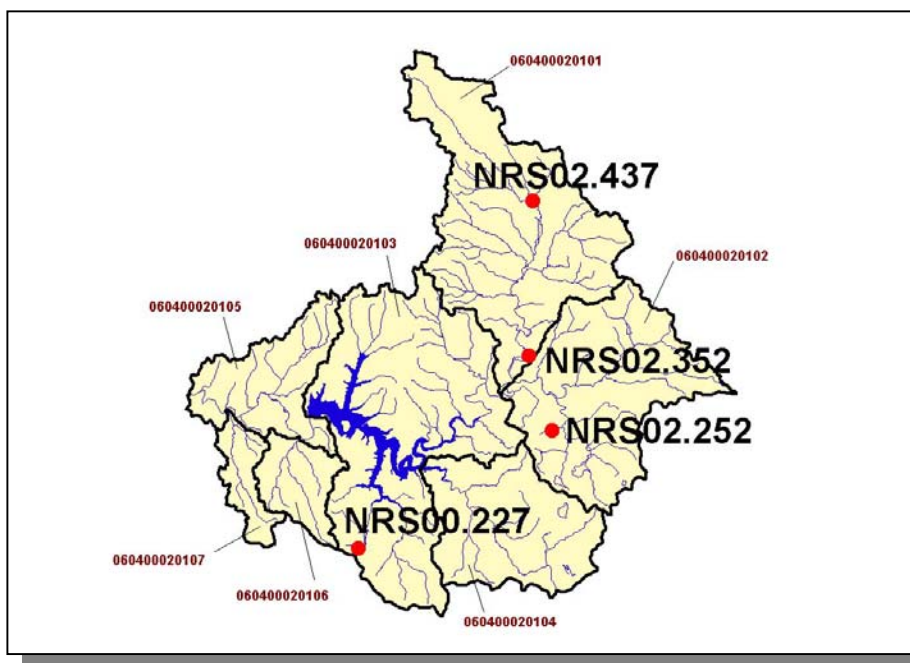




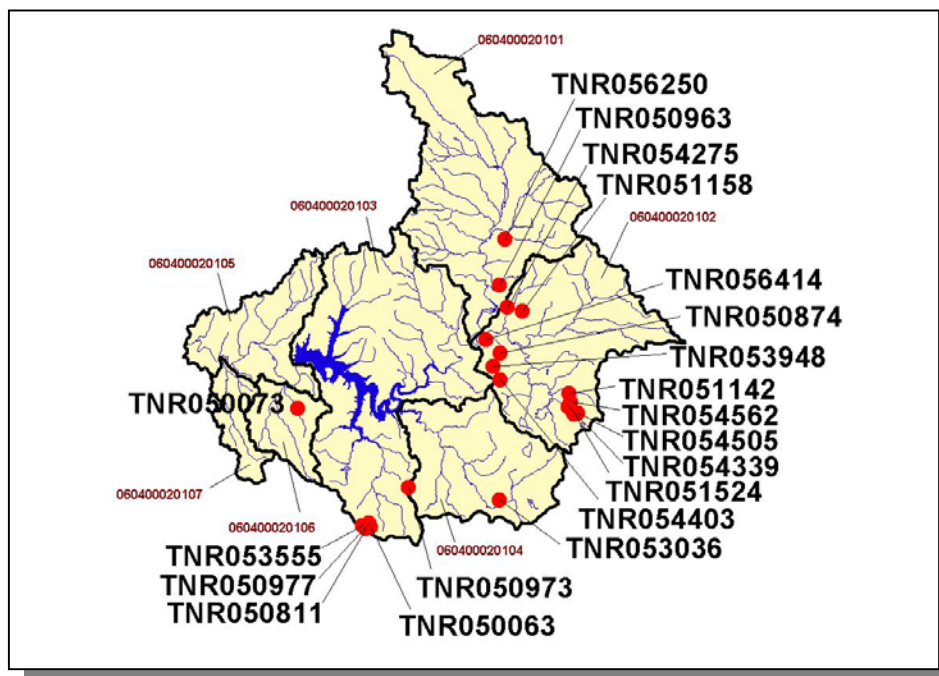
**Figure 4-11. Location of Water Treatment Plants in Subwatershed 0604000201.** Subwatershed 060400020101, 060400020102, 060400020103, 060400020104, 060400020105, 060400020106, and 060400020107 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.



**Figure 4-12. Location of Ready Mix Concrete Plants in Subwatershed 0604000201.** Subwatershed 060400020101, 060400020102, 060400020103, 060400020104, 060400020105, 060400020106, and 060400020107 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.



**Figure 4-13. Location of ARAP Sites (Individual Permits) in Subwatershed 0604000201.** Subwatershed 060400020101, 060400020102, 060400020103, 060400020104, 060400020105, 060400020106, and 060400020107 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.

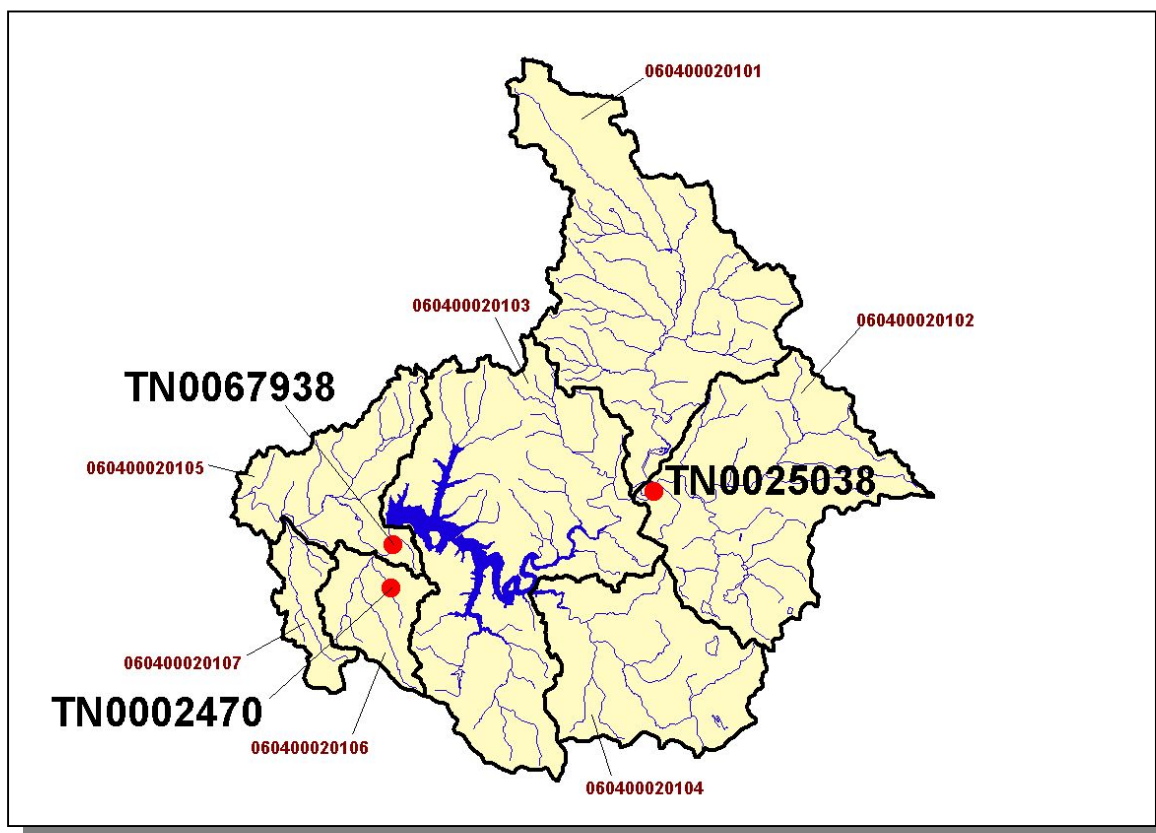


**Figure 4-14. Location of TMSP Facilities in Subwatershed 0604000201.** Subwatershed 060400020101, 060400020102, 060400020103, 060400020104, 060400020105, 060400020106, and 060400020107 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.

**4.2.A.ii.a. Dischargers to Water Bodies Listed on the 2002 303(d) List**

There are three NPDES facilities discharging to water bodies listed on the 2002 303(d) list in Subwatershed 0604000201:

- TN0067938 (TWRA-Normandy Fish Hatchery) discharges to Duck River @ RM 248.0
- TN0025038 (Manchester STP) discharges to Duck River @ RM 268.5
- TN0002470 (Tennessee Dickel Distilling Company) discharges to Cascade Creek @ RM 0.1 to cascade Branch @ RM 1.4



**Figure 4-15. Location of NPDES Dischargers to Water Bodies Listed on the 2002 303(d) List in Subwatershed 0604000201.** Subwatershed 060400020101, 060400020102, 060400020103, 060400020104, 060400020105, 060400020106, and 060400020107 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.

| PERMIT #  | 1Q10 | 3Q10 | 7Q10 | 3Q20 | QDESIGN |
|-----------|------|------|------|------|---------|
| TN0067938 | 48   | 48   | 48   | 45   |         |
| TN0025038 | 11.7 | 12.2 | 13.0 | 10.9 | 3.4     |
| TN0002470 |      |      |      |      |         |

**Table 4-5. Receiving Stream Flow Information for NPDES Dischargers to Waterbodies Listed on the 2002 303(d) List in Subwatershed 0604000201.** Data are in million gallons per day (MGD). Data were obtained from the USGS publication Flow Duration and Low Flows of Tennessee Streams Through 1992 or from permit files.

| PERMIT #  | WET | CBOD <sub>5</sub> | FECAL COLIFORM | E. COLI | NH <sub>3</sub> | Cl <sup>-</sup> | TRC | TSS | SETTLEABLE SOLIDS | DO | pH |
|-----------|-----|-------------------|----------------|---------|-----------------|-----------------|-----|-----|-------------------|----|----|
| TN0067938 | X   |                   |                |         |                 |                 |     | X   | X                 |    | X  |
| TN0025038 | X   | X                 | X              | X       | X               |                 | X   | X   | X                 | X  | X  |
| TN0002470 |     |                   |                |         |                 | X               |     | X   | X                 |    | X  |

**Table 4-6. Parameters Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2002 303(d) List in Subwatershed 0604000201.** WET, Whole Effluent Toxicity; CBOD<sub>5</sub>, Carbonaceous Biochemical Oxygen Demand (5-Day); TRC, Total Residual Chlorine; TSS, Total Suspended Solids, Cl<sup>-</sup>, Dissolved Chloride.

**4.2.A.iii. Nonpoint Source Contributions.**

| <b>LIVESTOCK (COUNTS)</b> |        |          |                   |                          |       |       |
|---------------------------|--------|----------|-------------------|--------------------------|-------|-------|
| Beef Cow                  | Cattle | Milk Cow | Chickens (Layers) | Chickens (Broilers Sold) | Hogs  | Sheep |
| 6,418                     | 15,967 | 1,396    | 15                | 2,617,260                | 1,416 | 119   |

**Table 4-7. Summary of Livestock Count Estimates in Subwatershed 0604000201.** According to the 1997 Census of Agriculture (<http://www.nass.usda.gov/census/>), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.

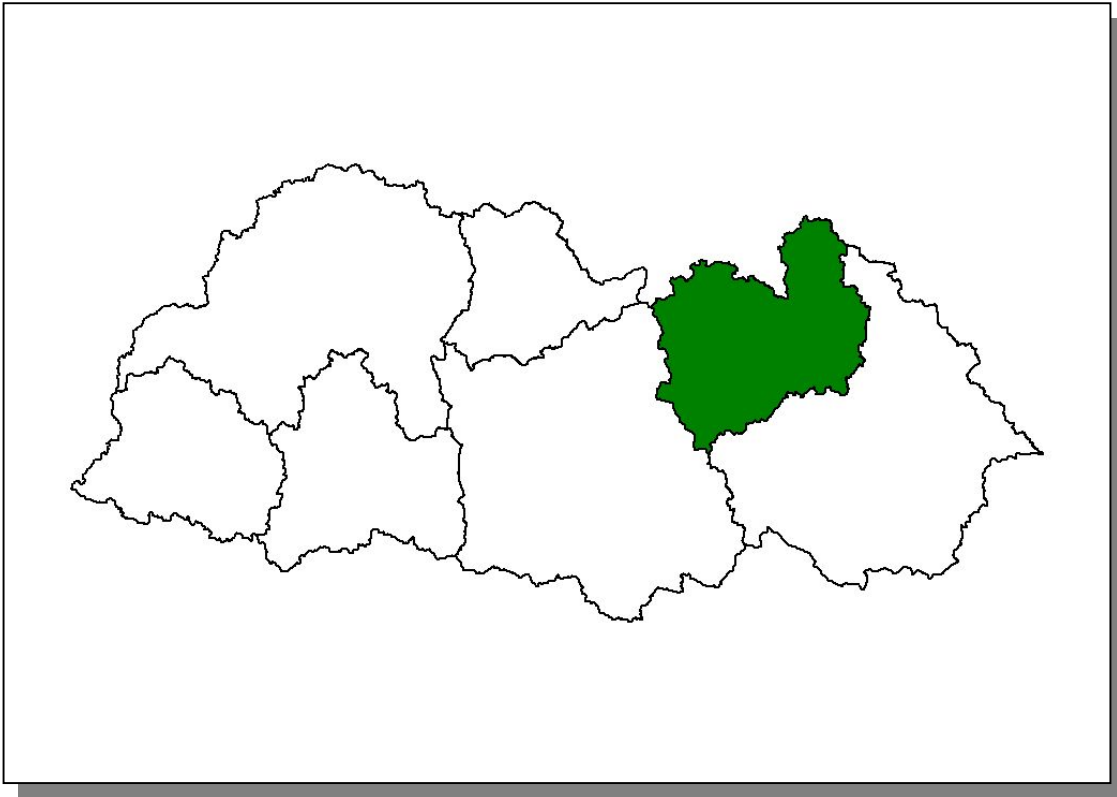
| County       | <b>INVENTORY</b>                |                                 | <b>REMOVAL RATE</b>                   |                                   |
|--------------|---------------------------------|---------------------------------|---------------------------------------|-----------------------------------|
|              | Forest Land<br>(thousand acres) | Timber Land<br>(thousand acres) | Growing Stock<br>(million cubic feet) | Sawtimber<br>(million board feet) |
| Bedford      | 74.6                            | 74.6                            | 0.5                                   | 1.3                               |
| Coffee       | 114.4                           | 114.2                           | 2.8                                   | 12.7                              |
| Franklin     | 183.4                           | 183.0                           | 6.0                                   | 28.7                              |
| Moore        | 36.6                            | 36.6                            | 0.0                                   | 0.0                               |
| <b>Total</b> | <b>409.0</b>                    | <b>408.4</b>                    | <b>9.3</b>                            | <b>42.7</b>                       |

**Table 4-8. Forest Acreage and Annual Removal Rates (1987-1994) in Subwatershed 0604000201.**

| <b>CROPS</b>                          | <b>TONS/ACRE/YEAR</b> |
|---------------------------------------|-----------------------|
| Grass (Pastureland)                   | 1.37                  |
| Grass (Hayland)                       | 0.82                  |
| Legumes (Hayland)                     | 0.72                  |
| Legumes, Grass (Hayland)              | 0.21                  |
| Grass, Forbs, Legumes (Mixed Pasture) | 0.31                  |
| Forest Land (Not Grazed)              | 0.00                  |
| Forest Land (Grazed)                  | 0.00                  |
| Corn (Row Crops)                      | 9.92                  |
| Cotton (Row Crops)                    | 4.03                  |
| Soybeans (Row Crops)                  | 14.90                 |
| Wheat (Close-Grown Cropland)          | 12.41                 |
| All Other Close-Grown Cropland        | 5.82                  |
| Other Vegetable and Truck Crop        | 4.37                  |
| Summer Fallow (Other Cropland)        | 4.60                  |
| Other Cropland not Planted            | 6.65                  |
| Other Horticulture                    | 1.92                  |
| Conservation Reserve Program Lands    | 0.15                  |
| Non-Agricultural Land Use             | 0.00                  |
| Farmsteads and Ranch Headquarters     | 0.16                  |

**Table 4-9. Annual Estimated Total Soil Loss in Subwatershed 0604000201.**

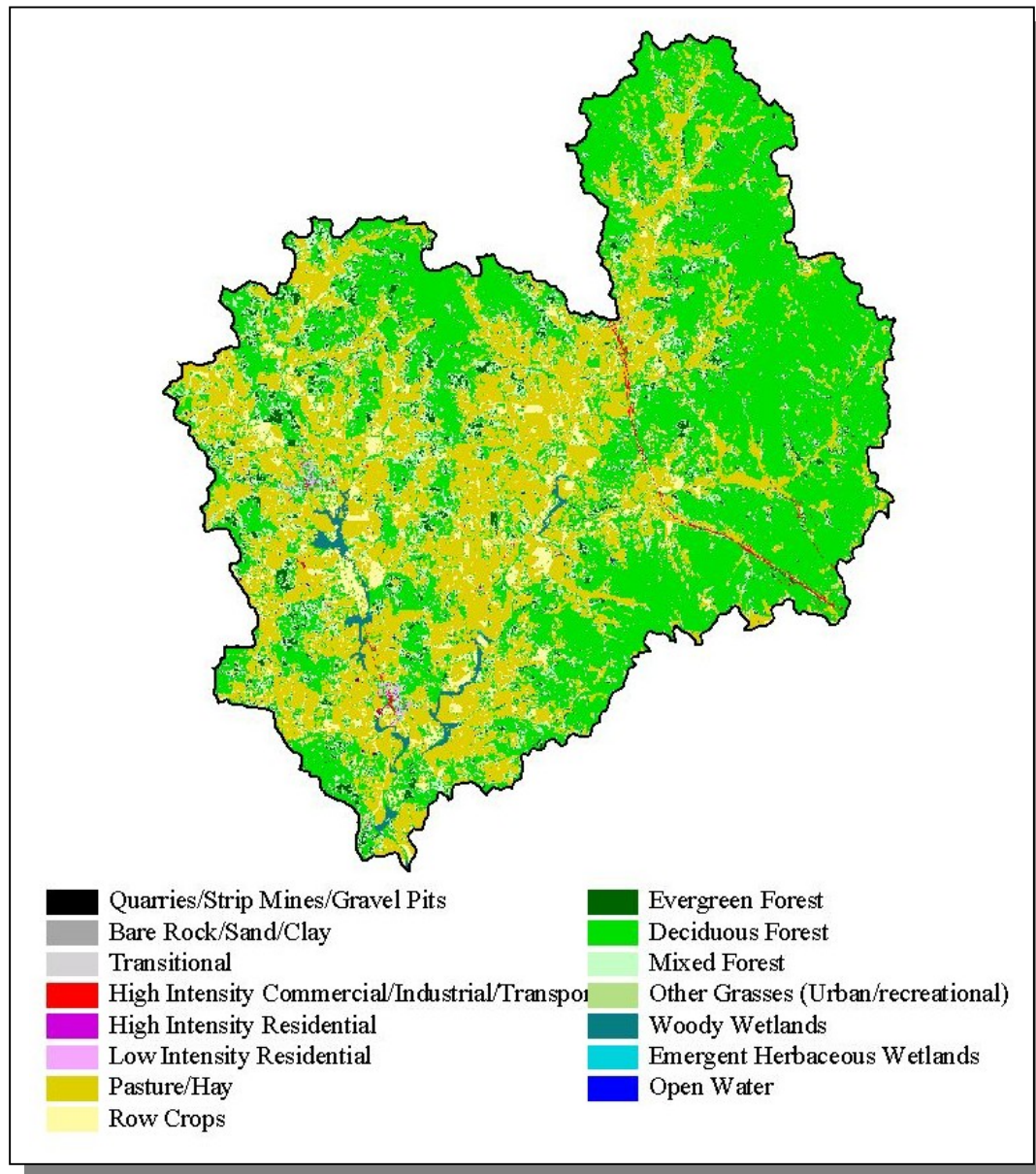
**4.2.B. 0604000202 (Garrison Fork).**



**Figure 4-16. Location of Subwatershed 0604000202.** All Upper Duck River HUC-10 subwatershed boundaries are shown for reference.

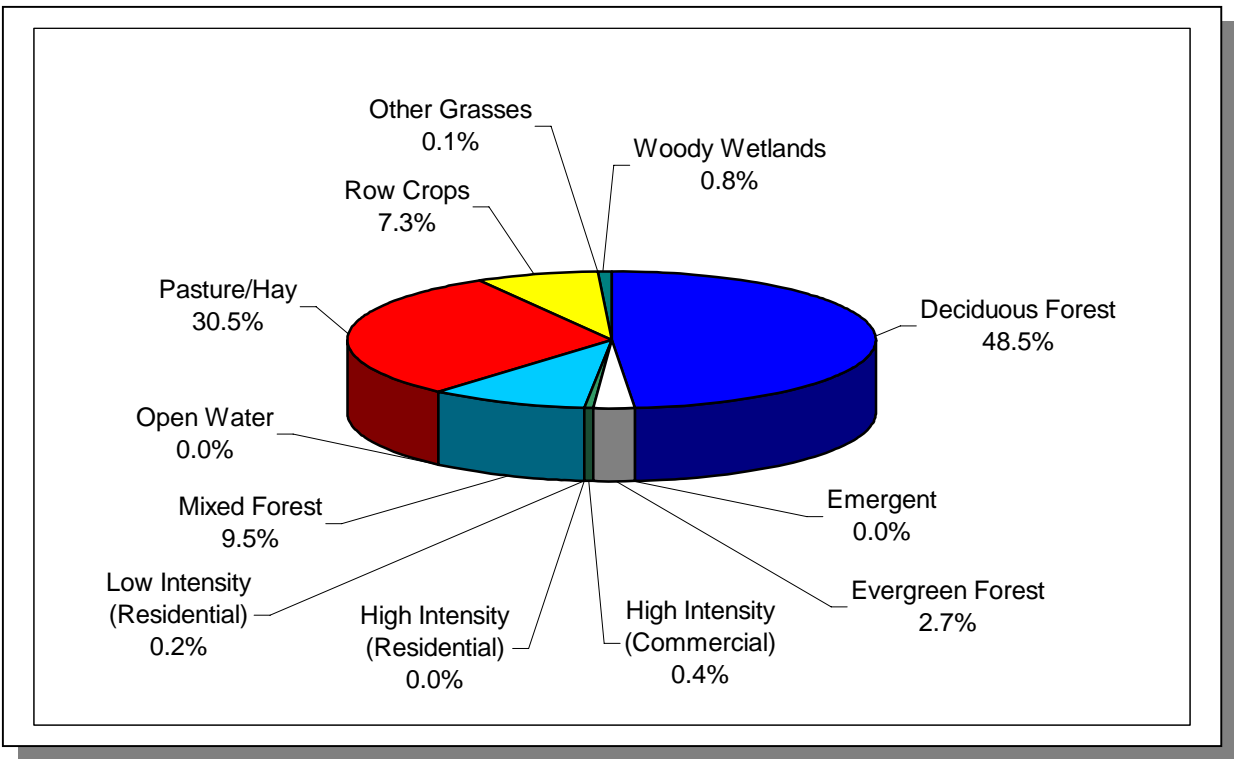


4.2.B.i. General Description.

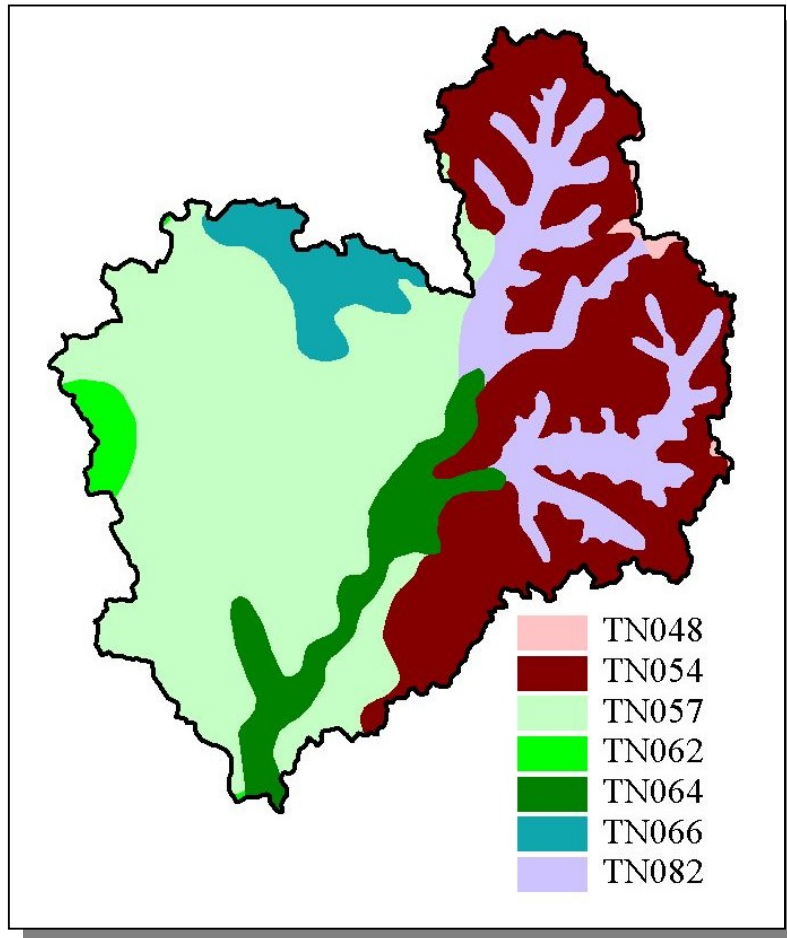


*Figure 4-17. Illustration of Land Use Distribution in Subwatershed 0604000202.*





**Figure 4-18. Land Use Distribution in Subwatershed 0604000202.** More information is provided in Appendix IV.



**Figure 4-19. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0604000202.**

| STATSGO<br>MAP UNIT ID | PERCENT<br>HYDRIC | HYDROLOGIC<br>GROUP | PERMEABILITY<br>(in/hour) | SOIL<br>pH | ESTIMATED<br>SOIL TEXTURE | SOIL<br>ERODIBILITY |
|------------------------|-------------------|---------------------|---------------------------|------------|---------------------------|---------------------|
| TN048                  | 8.00              | C                   | 1.38                      | 5.06       | Silty Loam                | 0.42                |
| TN054                  | 0.00              | C                   | 3.04                      | 4.84       | Loam                      | 0.32                |
| TN057                  | 0.00              | C                   | 1.14                      | 5.01       | Clayey Loam               | 0.33                |
| TN062                  | 0.00              | C                   | 0.98                      | 4.40       | Clayey Loam               | 0.26                |
| TN064                  | 7.00              | C                   | 1.19                      | 5.82       | Silty Loam                | 0.37                |
| TN066                  | 0.00              | B                   | 2.62                      | 4.75       | Loam                      | 0.28                |
| TN082                  | 0.00              | B                   | 1.63                      | 5.47       | Loam                      | 0.34                |

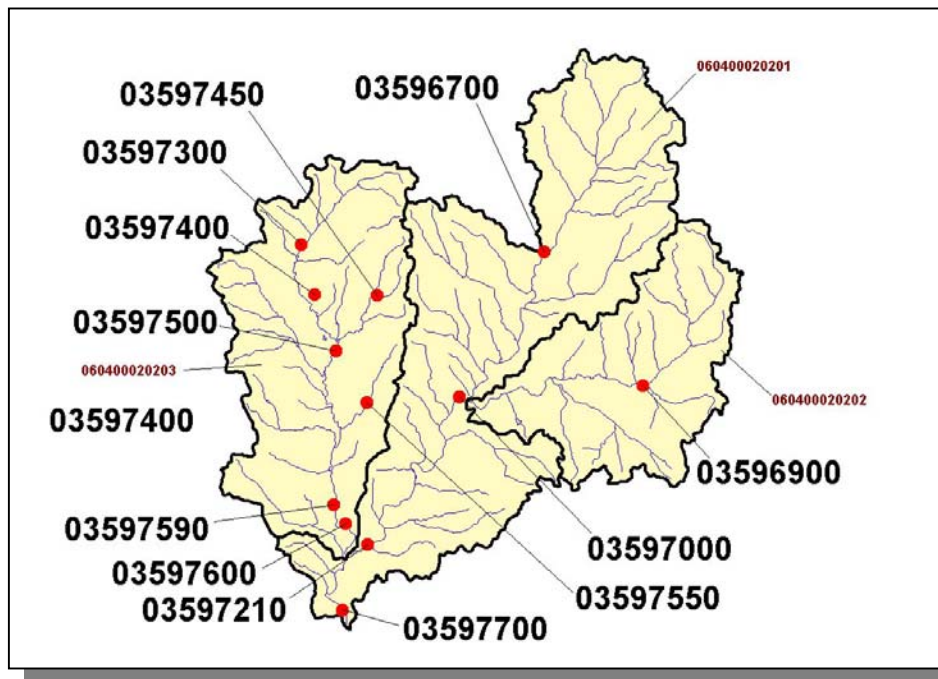
**Table 4-10. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0604000202.** More information is provided in Appendix IV.

| County        | COUNTY POPULATION |                |                | Portion of Watershed (%) | ESTIMATED POPULATION IN WATERSHED |               |               | % Change (1990-1997) |
|---------------|-------------------|----------------|----------------|--------------------------|-----------------------------------|---------------|---------------|----------------------|
|               | 1990              | 1997           | 2000           |                          | 1990                              | 1997          | 2000          |                      |
| Bedford       | 30,411            | 34,203         | 37,586         | 17.35                    | 5,277                             | 5,934         | 6,521         | 23.6                 |
| Coffee        | 40,339            | 45,347         | 48,014         | 10.39                    | 4,190                             | 4,710         | 4,987         | 19.0                 |
| Rutherford    | 118,570           | 159,987        | 182,023        | 0.4                      | 479                               | 646           | 735           | 53.4                 |
| <b>Totals</b> | <b>189,320</b>    | <b>239,537</b> | <b>267,623</b> |                          | <b>9,946</b>                      | <b>11,290</b> | <b>12,243</b> | <b>23.1</b>          |

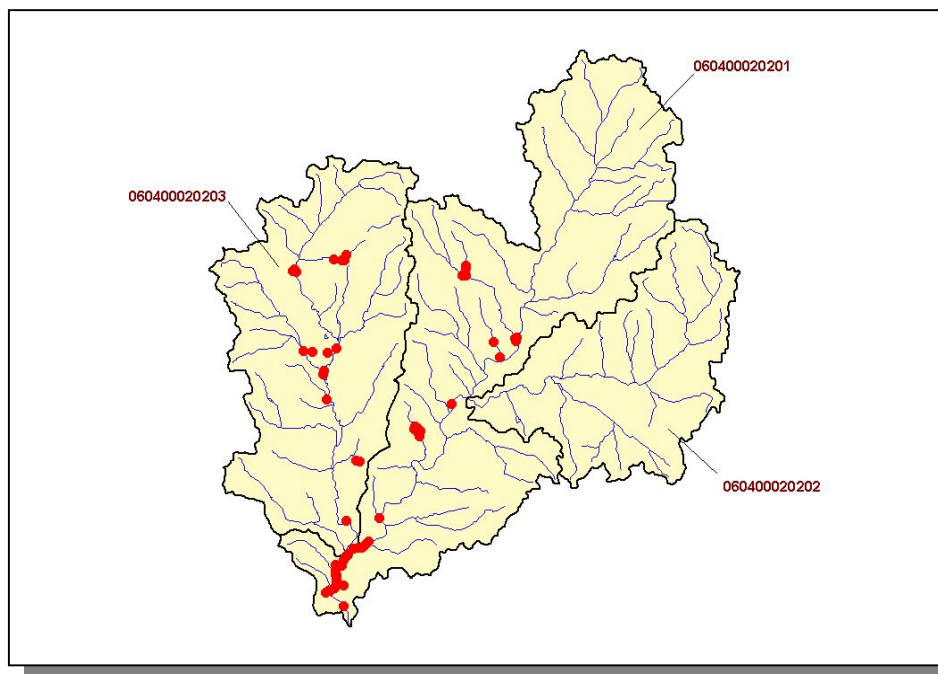
*Table 4-11. Population Estimates in Subwatershed 0604000202.*

|                 |         |            | NUMBER OF HOUSING UNITS |              |             |          |
|-----------------|---------|------------|-------------------------|--------------|-------------|----------|
| Populated Place | County  | Population | Total                   | Public Sewer | Septic Tank | Other    |
|                 |         |            |                         |              |             |          |
| Bell Buckle     | Bedford | 324        | 136                     | 129          | 7           | 0        |
| Wartrace        | Bedford | 496        | 233                     | 200          | 33          | 0        |
| <b>Totals</b>   |         | <b>820</b> | <b>369</b>              | <b>329</b>   | <b>40</b>   | <b>0</b> |

*Table 4-12. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 0604000202.*

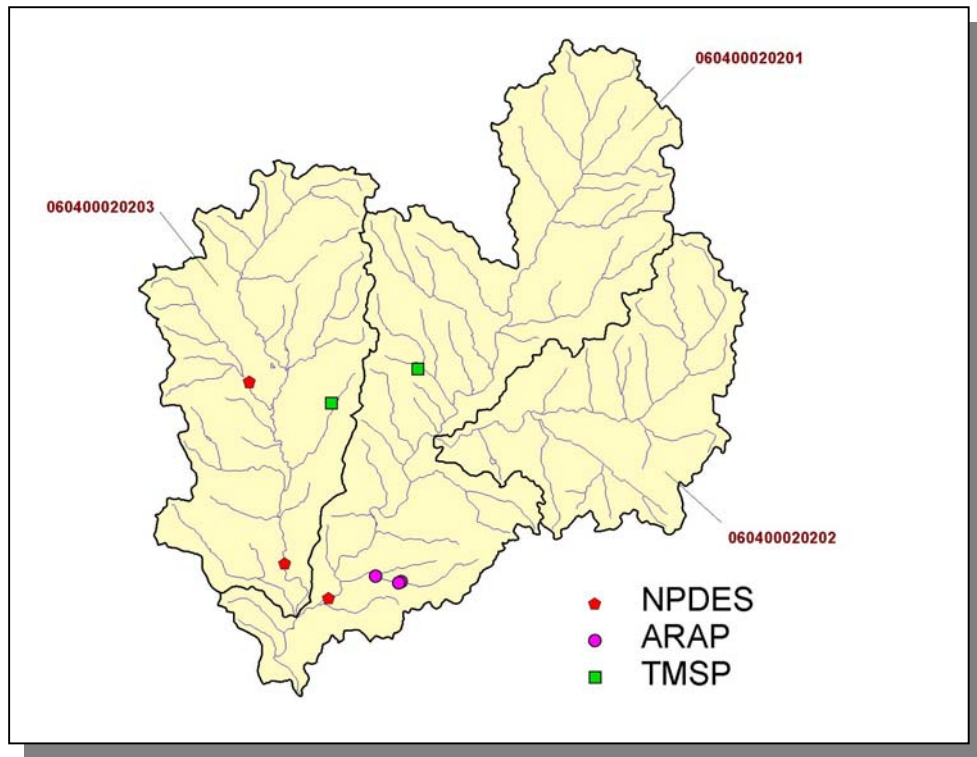


**Figure 4-20. Location of Historical Streamflow Data Collection Sites in Subwatershed 0604000202.** Subwatershed 060400020201, 060400020202, and 060400020203 boundaries are shown for reference. More information is provided in Appendix IV.

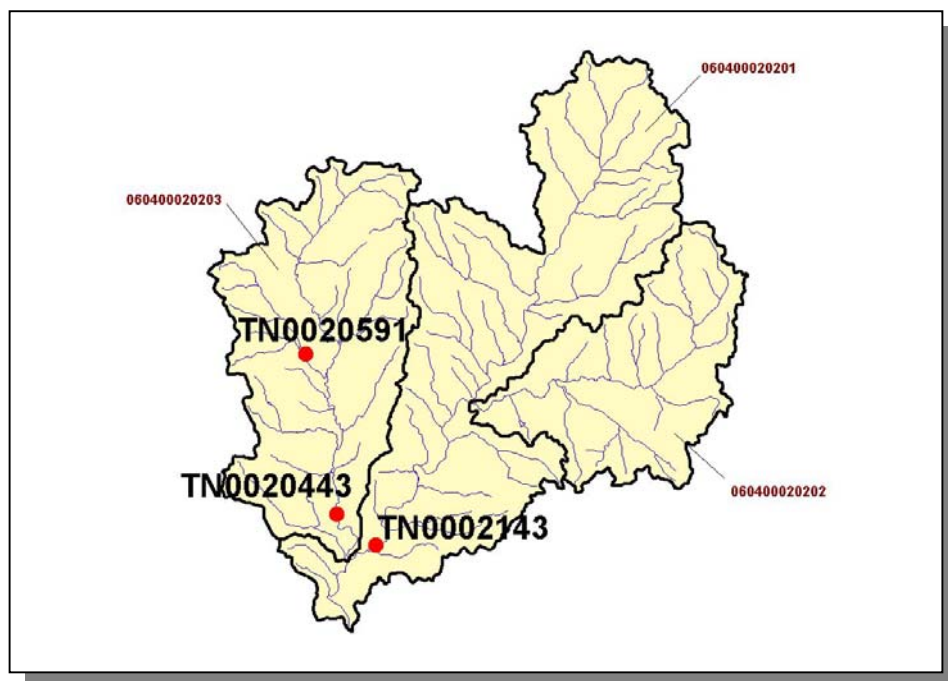


**Figure 4-21. Location of STORET Monitoring Sites in Subwatershed 0604000202.** Subwatershed 060400020101, 060400020102, and 060400020103 boundaries are shown for reference. More information, including site names and locations, is provided in Appendix IV.

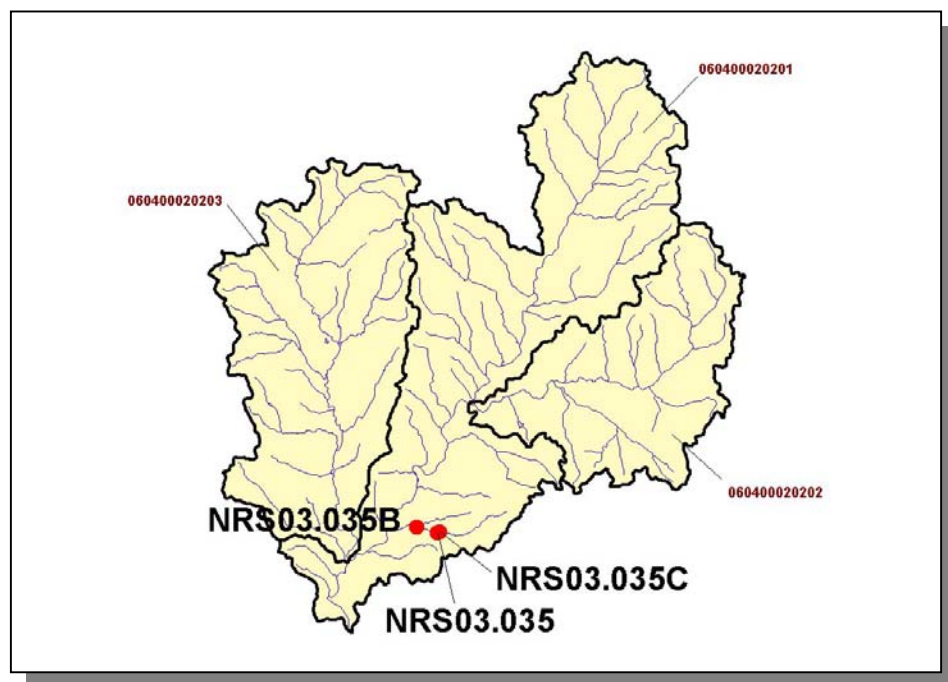
**4.2.B.ii.** Point Source Contributions.



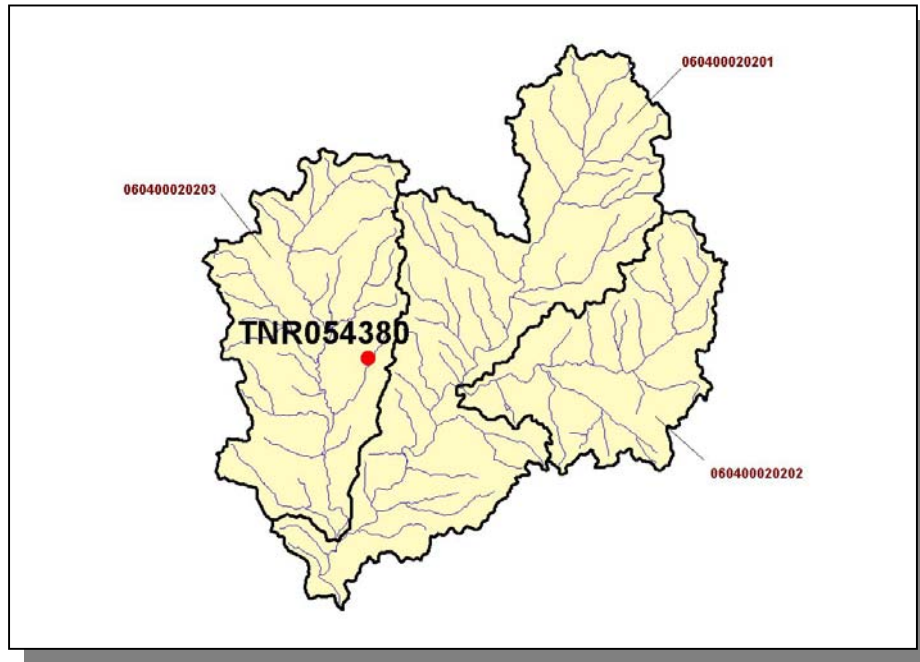
**Figure 4-22. Location of Active Point Source Facilities in Subwatershed 0604000202.** Subwatershed 0604000202, 0604000202, and 0604000202 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.



**Figure 4-23. Location of NPDES Facilities in Subwatershed 0604000202.** Subwatershed 0604000202, 0604000202, and 0604000202 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.



**Figure 4-24. Location of ARAP Sites (Individual Permits) in Subwatershed 0604000202.** Subwatershed 0604000202, 0604000202, and 0604000202 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.



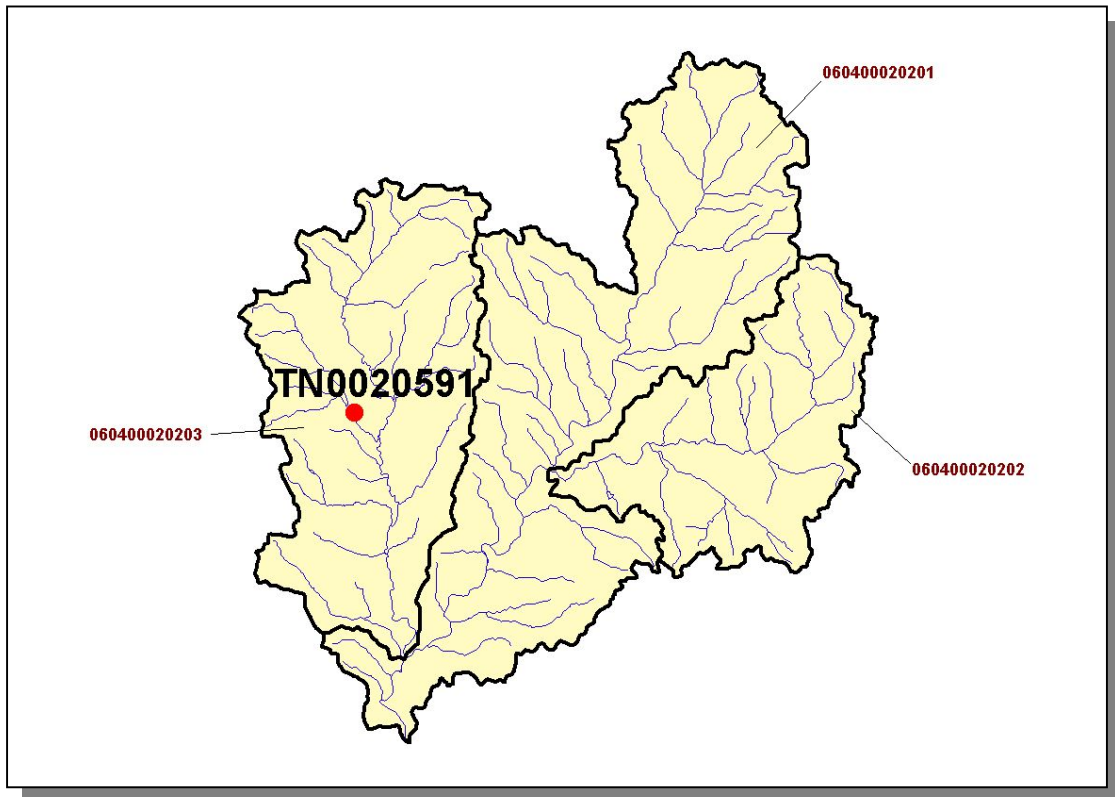
**Figure 4-25. Location of TMSF Facilities in Subwatershed 0604000202.** Subwatershed 0604000202, 0604000202, and 0604000202 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.



**4.2.B.ii.a. Dischargers to Water Bodies Listed on the 2002 303(d) List**

There is one NPDES facility discharging to water bodies listed on the 2002 303(d) list in Subwatershed 0604000202:

- TN0020591 (Bell Buckle STP) discharges to Bell Buckle Creek @ RM 0.8



**Figure 4-26. Location of NPDES Dischargers to Water Bodies Listed on the 2002 303(d) List in Subwatershed 0604000202.** Subwatershed 0604000201, 0604000202, and 0604000203 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.

| PERMIT #  | 1Q10 | 3Q10 | 7Q10 | 3Q20 | QDESIGN |
|-----------|------|------|------|------|---------|
| TN0020591 |      |      | 0    | 0    | 0.15    |

**Table 4-13. Receiving Stream Flow Information for NPDES Dischargers to Waterbodies Listed on the 2002 303(d) List in Subwatershed 0604000202.** Data are in million gallons per day (MGD). Data were obtained from the USGS publication Flow Duration and Low Flows of Tennessee Streams Through 1992 or from permit files.

| PERMIT #  | CBOD <sub>5</sub> | FECAL COLIFORM | E. COLI | NH <sub>3</sub> | TRC | TSS | SETTLEABLE SOLIDS | DO | pH |
|-----------|-------------------|----------------|---------|-----------------|-----|-----|-------------------|----|----|
| TN0020591 | X                 | X              | X       | X               | X   | X   | X                 | X  | X  |

**Table 4-14. Parameters Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2002 303(d) List in Subwatershed 0604000202.** CBOD<sub>5</sub>, Carbonaceous Biochemical Oxygen Demand (5-Day); TRC, Total Residual Chlorine; TSS, Total Suspended Solids.

**4.2.B.iii.** Nonpoint Source Contributions.

| <b>LIVESTOCK (COUNTS)</b> |        |          |                   |                          |      |       |
|---------------------------|--------|----------|-------------------|--------------------------|------|-------|
| Beef Cow                  | Cattle | Milk Cow | Chickens (layers) | Chickens (Broilers Sold) | Hogs | Sheep |
| 6,276                     | 13,411 | 949      | 18                | 5,415,250                | 982  | 96    |

**Table 4-15. Summary of Livestock Count Estimates in Subwatershed 0604000202.**  
According to the 1997 Census of Agriculture (<http://www.nass.usda.gov/census/>), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.

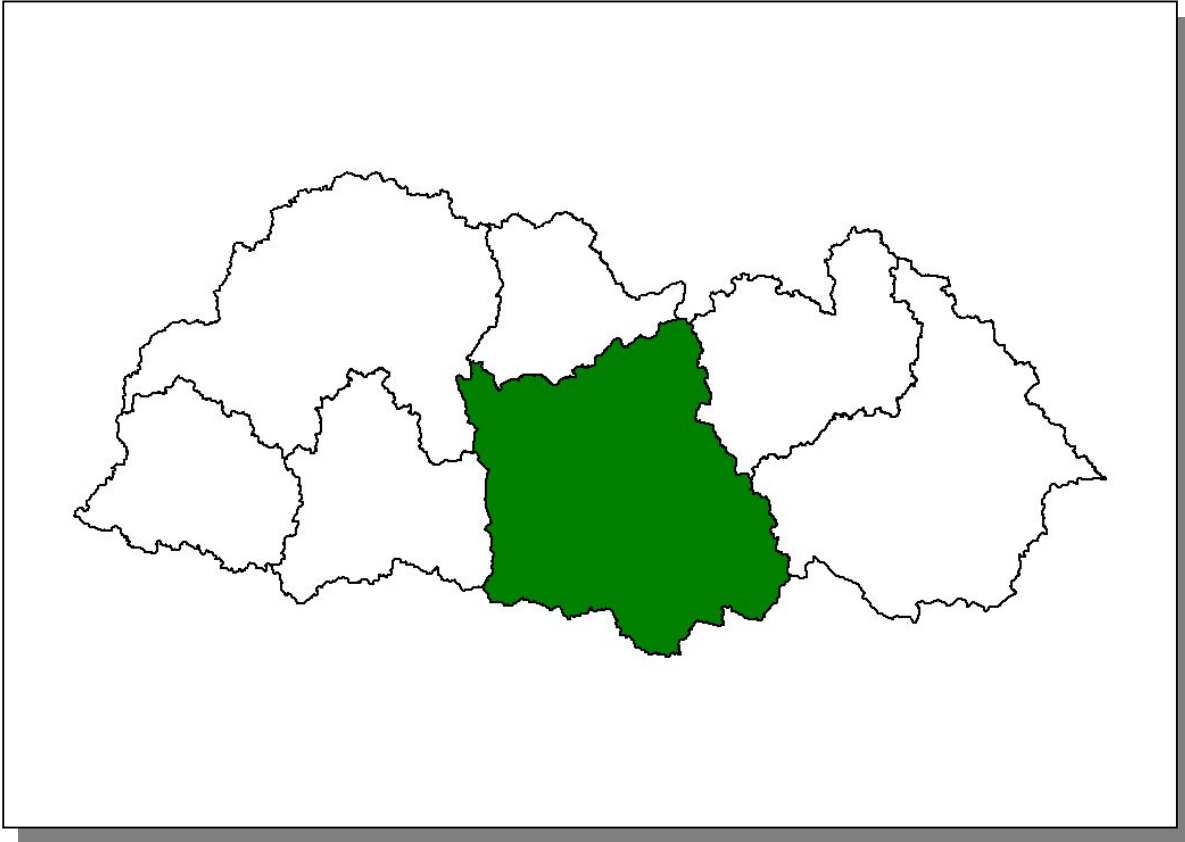
| County       | <b>INVENTORY</b>             |                              | <b>REMOVAL RATE</b>                |                                |
|--------------|------------------------------|------------------------------|------------------------------------|--------------------------------|
|              | Forest Land (thousand acres) | Timber Land (thousand acres) | Growing Stock (million cubic feet) | Sawtimber (million board feet) |
| Bedford      | 74.6                         | 74.6                         | 0.5                                | 1.3                            |
| Coffee       | 114.4                        | 114.4                        | 2.8                                | 12.7                           |
| <b>Total</b> | <b>189.0</b>                 | <b>189.0</b>                 | <b>3.3</b>                         | <b>14.0</b>                    |

**Table 4-16. Forest Acreage and Average Annual Removal Rates (1987-1994) in Subwatershed 0604000202.**

| <b>CROPS</b>                          | <b>TONS/ACRE/YEAR</b> |
|---------------------------------------|-----------------------|
| Legumes (Pastureland)                 | 0.12                  |
| Grass (Pastureland)                   | 0.98                  |
| Grass (Hayland)                       | 1.05                  |
| Legumes (Hayland)                     | 0.32                  |
| Legumes, Grass (Hayland)              | 0.42                  |
| Grass, Forbs, Legumes (Mixed Pasture) | 0.36                  |
| Forest Land (Not Grazed)              | 0.00                  |
| Forest Land (Grazed)                  | 0.00                  |
| Corn (Row Crops)                      | 6.52                  |
| Cotton (Row Crops)                    | 4.07                  |
| Soybeans (Row Crops)                  | 9.51                  |
| Wheat (Close-Grown Cropland)          | 6.32                  |
| Other Vegetable and Truck Crop        | 4.37                  |
| Summer Fallow (Other Cropland)        | 4.60                  |
| Other Cropland not Planted            | 6.68                  |
| Berry (Horticulture)                  | 4.60                  |
| Conservation Reserve Program Lands    | 0.26                  |
| Non-Agricultural Land Use             | 0.00                  |
| Farmsteads and Ranch Headquarters     | 0.10                  |

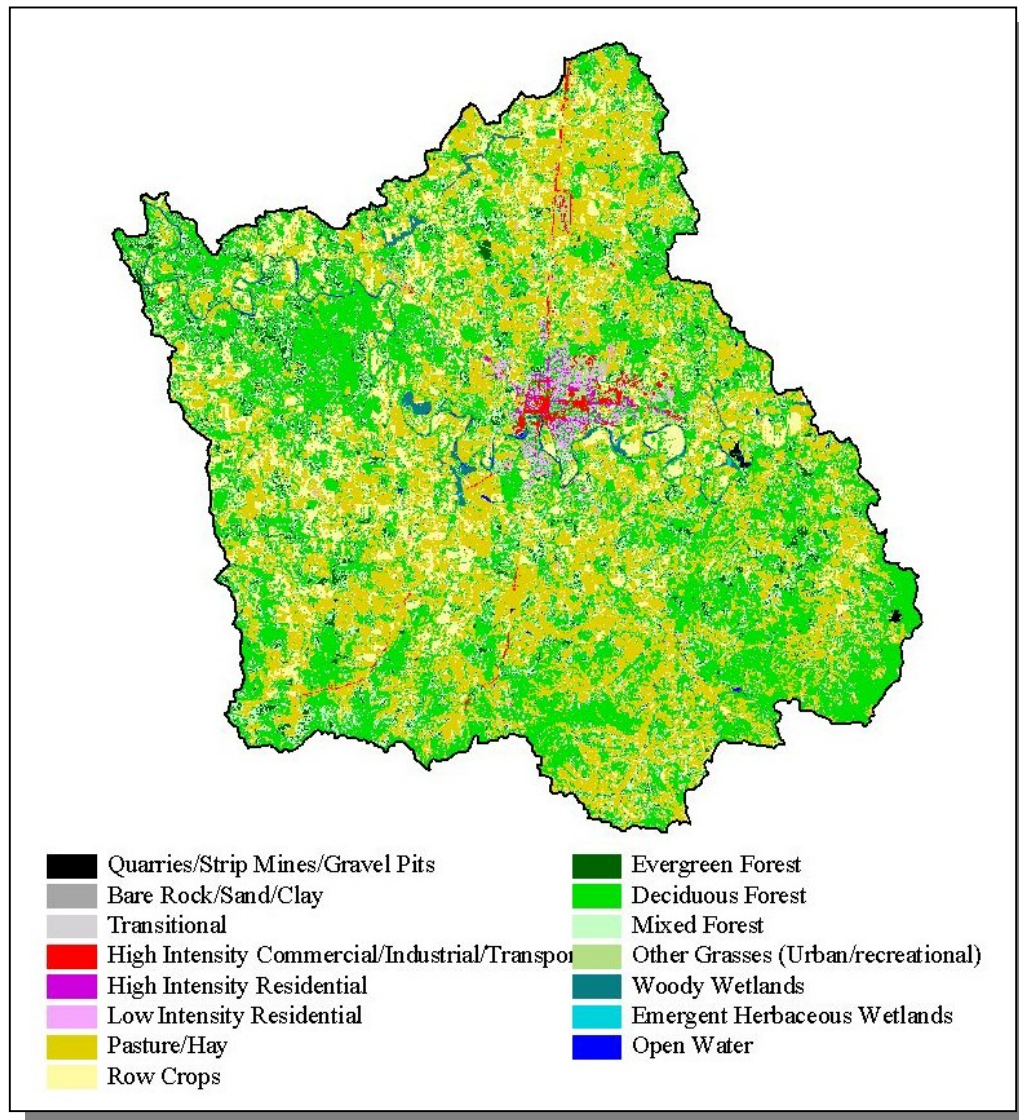
**Table 4-17. Annual Estimated Total Soil Loss in Subwatershed 0604000202.**

**4.2.C. 0604000203 (Duck River).**

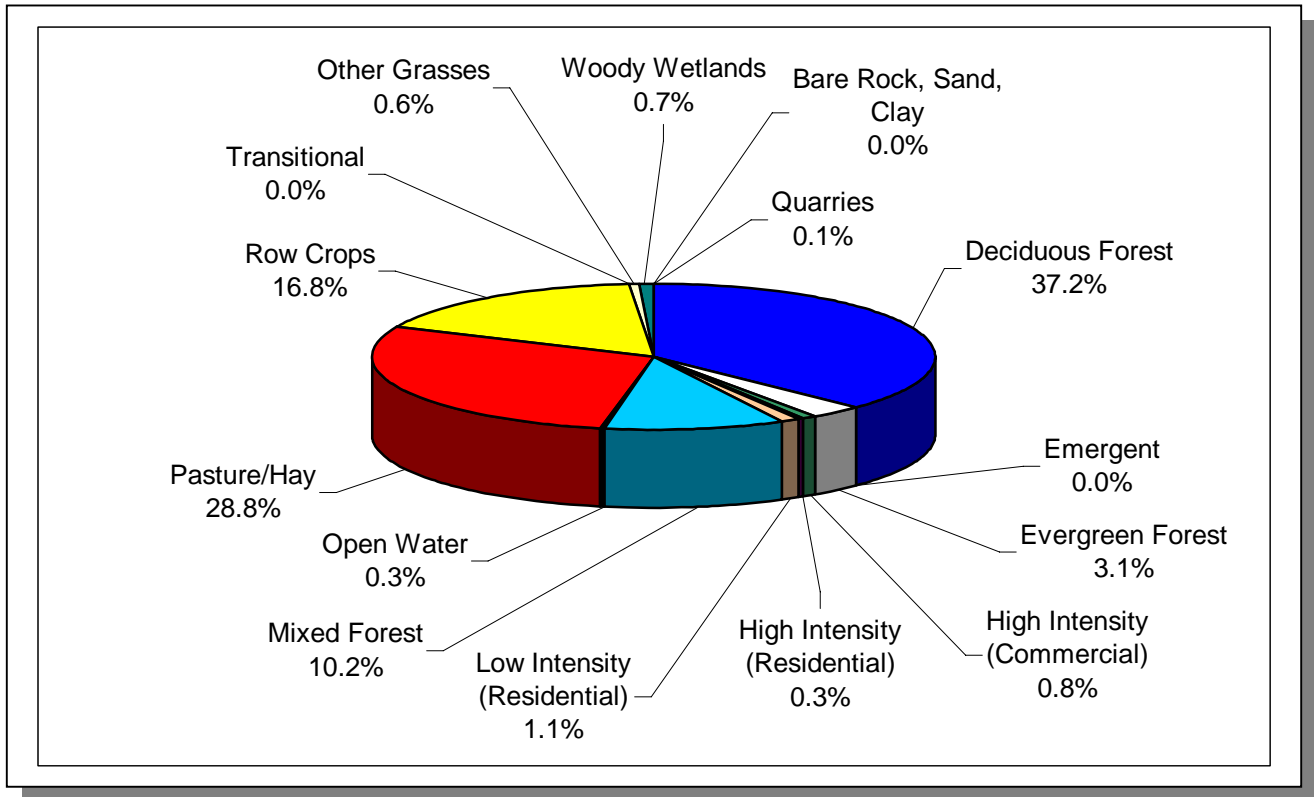


**Figure 4-27. Location of Subwatershed 0604000203.** All Upper Duck HUC-10 subwatershed boundaries are shown for reference.

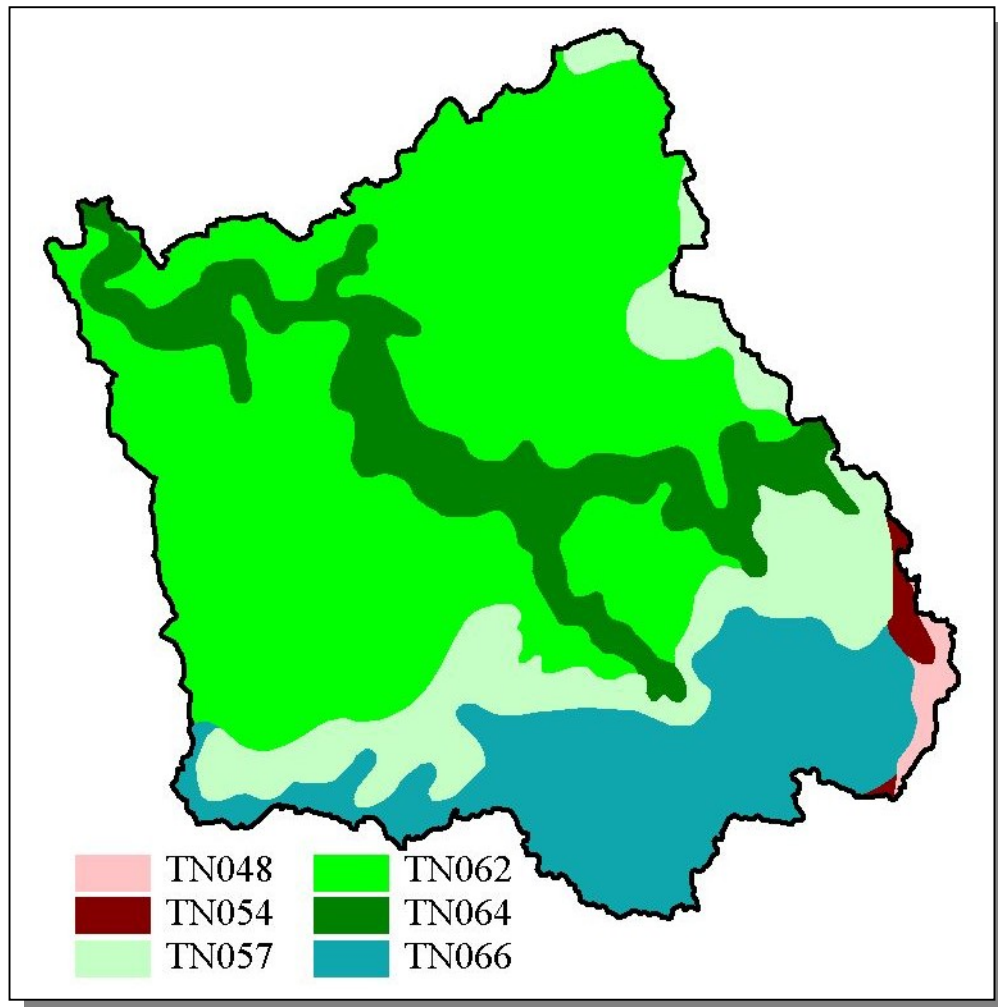
4.2.C.i. General Description.



**Figure 4-28. Illustration of Land Use Distribution in Subwatershed 0604000203.**



**Figure 4-29. Land Use Distribution in Subwatershed 0604000203.** More information is provided in Appendix IV.



**Figure 4-30. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0604000203.**

| STATSGO<br>MAP UNIT ID | PERCENT<br>HYDRIC | HYDROLOGIC<br>GROUP | PERMEABILITY<br>(in/hour) | SOIL<br>pH | ESTIMATED SOIL<br>TEXTURE | SOIL<br>ERODIBILITY |
|------------------------|-------------------|---------------------|---------------------------|------------|---------------------------|---------------------|
| TN048                  | 8.00              | C                   | 1.38                      | 5.06       | Silty Loam                | 0.42                |
| TN054                  | 0.00              | C                   | 3.04                      | 4.84       | Loam                      | 0.32                |
| TN057                  | 8.00              | C                   | 1.14                      | 5.01       | Clayey Loam               | 0.33                |
| TN062                  | 0.00              | C                   | 0.98                      | 4.40       | Clayey Loam               | 0.26                |
| TN064                  | 7.00              | C                   | 1.19                      | 5.82       | Silty Loam                | 0.37                |
| TN066                  | 0.00              | B                   | 2.62                      | 4.75       | Loam                      | 0.28                |

**Table 4-18. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0604000203.** More information is provided in Appendix IV.

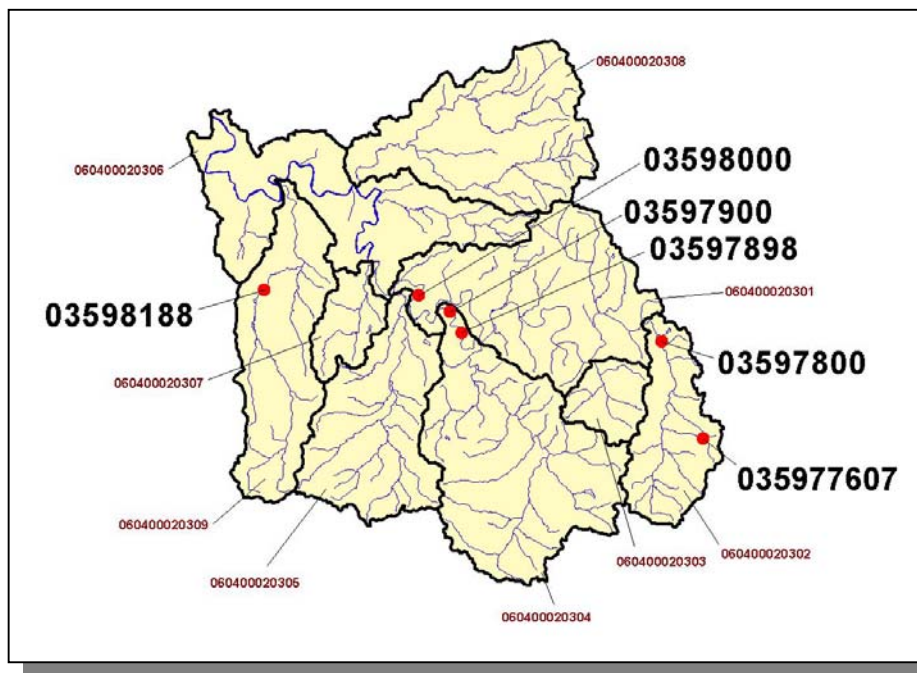


| County        | COUNTY POPULATION |               |                | Portion of Watershed (%) | ESTIMATED POPULATION IN WATERSHED |               |               | % Change (1990-1997) |
|---------------|-------------------|---------------|----------------|--------------------------|-----------------------------------|---------------|---------------|----------------------|
|               | 1990              | 1997          | 2000           |                          | 1990                              | 1997          | 2000          |                      |
| Bedford       | 30,411            | 34,203        | 37,586         | 53.97                    | 16,412                            | 18,458        | 20,284        | 23.6                 |
| Lincoln       | 28,157            | 29,336        | 31,340         | 0.48                     | 135                               | 141           | 150           | 11.1                 |
| Marshall      | 21,539            | 25,687        | 26,767         | 0.37                     | 79                                | 94            | 98            | 24.1                 |
| Moore         | 4,721             | 5,205         | 5,740          | 7.66                     | 362                               | 399           | 440           | 21.5                 |
| <b>Totals</b> | <b>84,828</b>     | <b>94,431</b> | <b>101,433</b> |                          | <b>16,986</b>                     | <b>19,092</b> | <b>20,972</b> | <b>23.5</b>          |

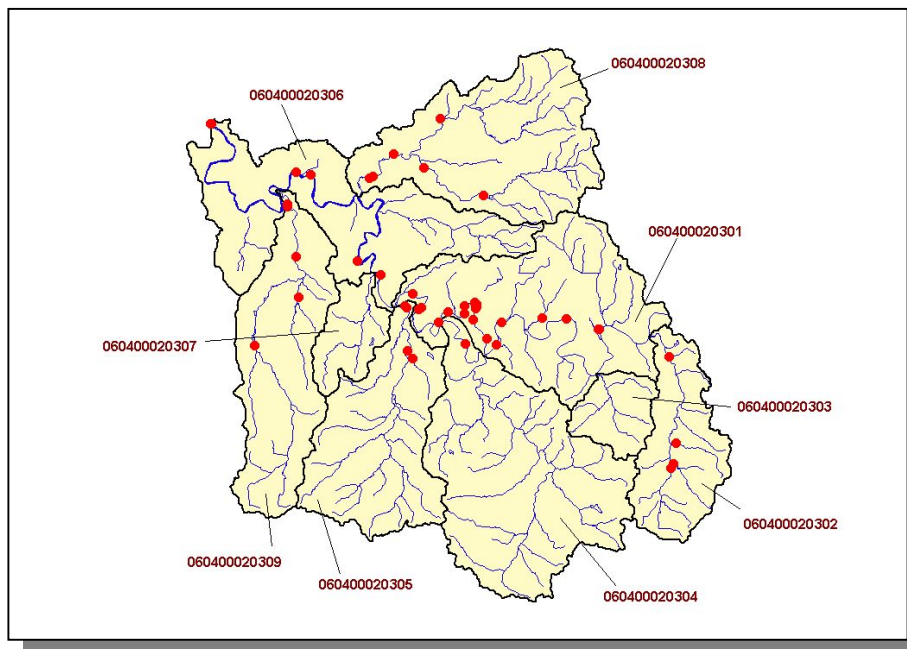
*Table 4-19. Population Estimates in Subwatershed 0604000203.*

| Populated Place | County  | Population | Total | NUMBER OF HOUSING UNITS |             |       |
|-----------------|---------|------------|-------|-------------------------|-------------|-------|
|                 |         |            |       | Public Sewer            | Septic Tank | Other |
| Shelbyville     | Bedford | 14,049     | 6,163 | 5,846                   | 299         | 18    |

*Table 4-20. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 0602000203.*

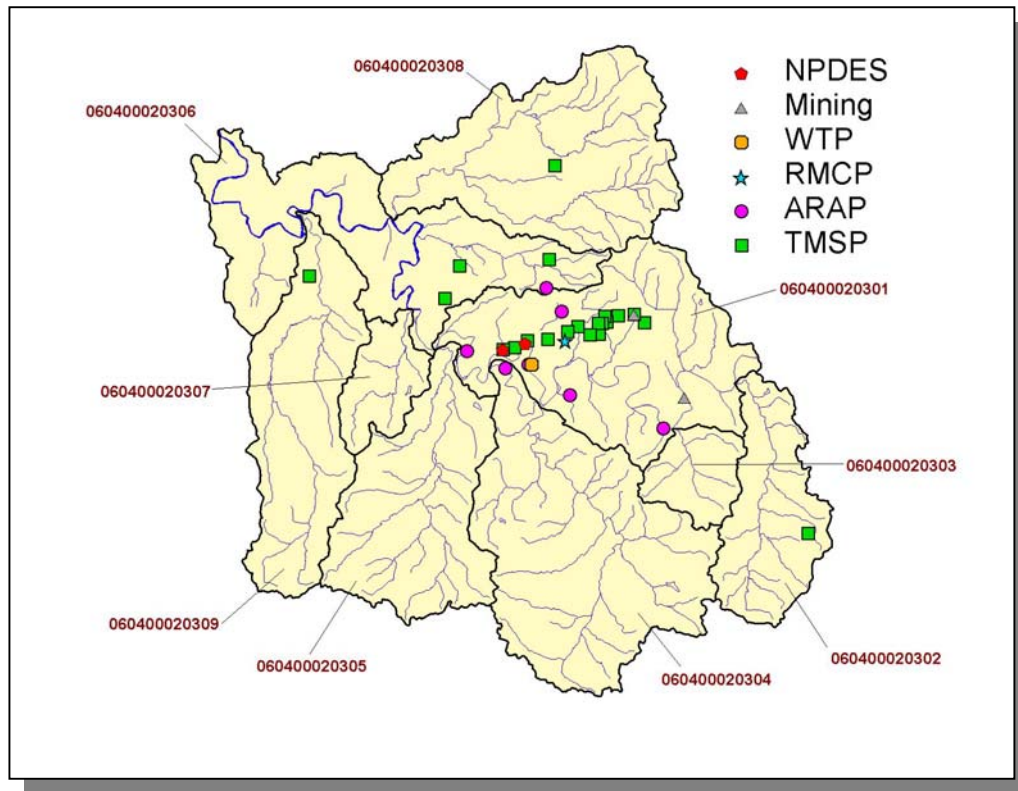


**Figure 4-31. Location of Historical Streamflow Data Collection Sites in Subwatershed 0604000203.** Subwatershed 060400020301, 060400020302, 060400020303, 060400020304, 060400020305, 060400020306, 060400020307, 060400020308 and 060400020309 boundaries are shown for reference. More information is provided in Appendix IV.

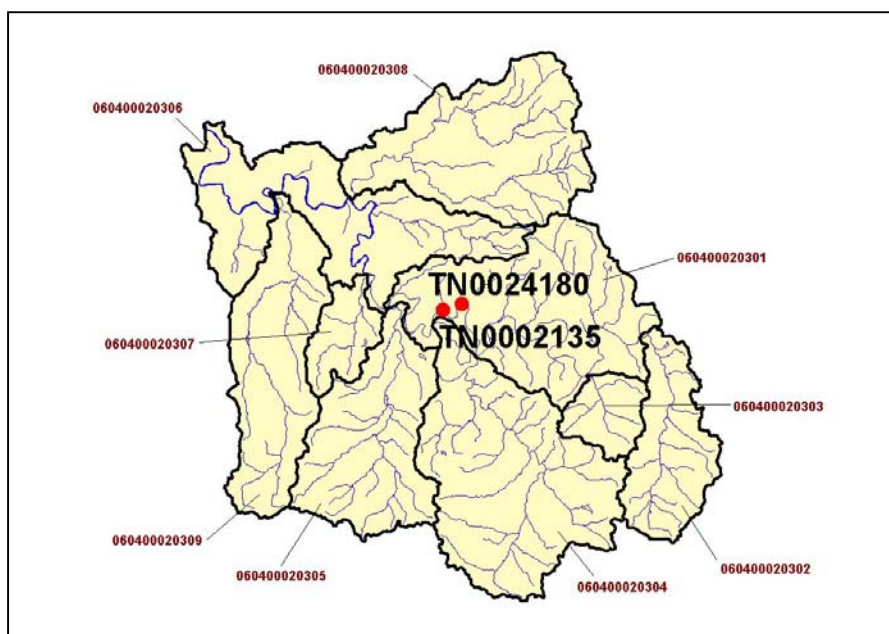


**Figure 4-32. Location of STORET Monitoring Sites in Subwatershed 0604000203.** Subwatershed 060400020301, 060400020302, 060400020303, 060400020304, 060400020305, 060400020306, 060400020307, 060400020308 and 060400020309 boundaries are shown for reference. More information, including site names and locations, is provided in Appendix IV.

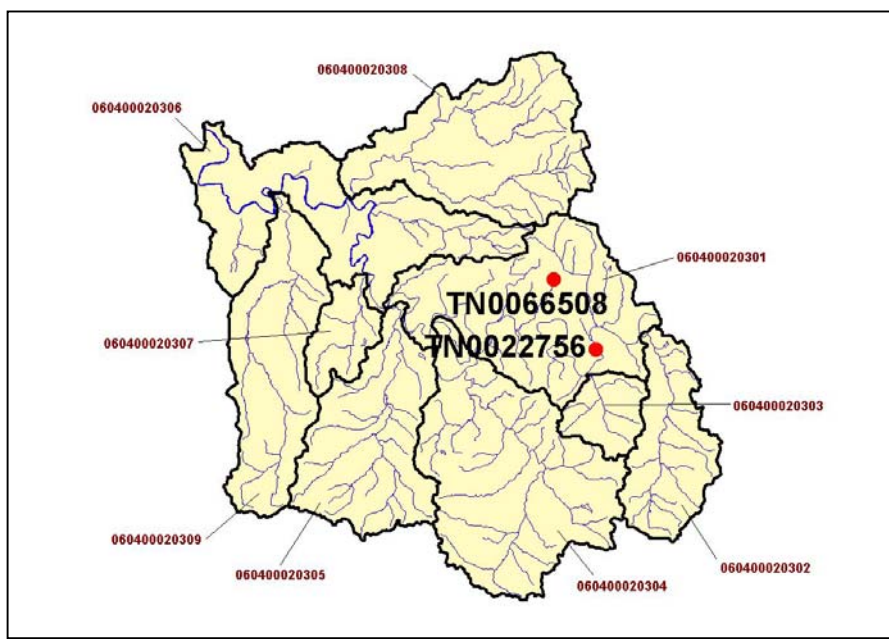
**4.2.C.ii.** Point Source Contributions.



**Figure 4-33. Location of Active Point Source Facilities in Subwatershed 0604000203.** Subwatershed 060400020301, 060400020302, 060400020303, 060400020304, 060400020305, 060400020306, 060400020307, 060400020308, and 060400020309 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.



**Figure 4-34. Location of NPDES Facilities in Subwatershed 0604000203.** Subwatershed 060400020301, 060400020302, 060400020303, 060400020304, 060400020305, 060400020306, 060400020307, 060400020308, and 060400020309 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.

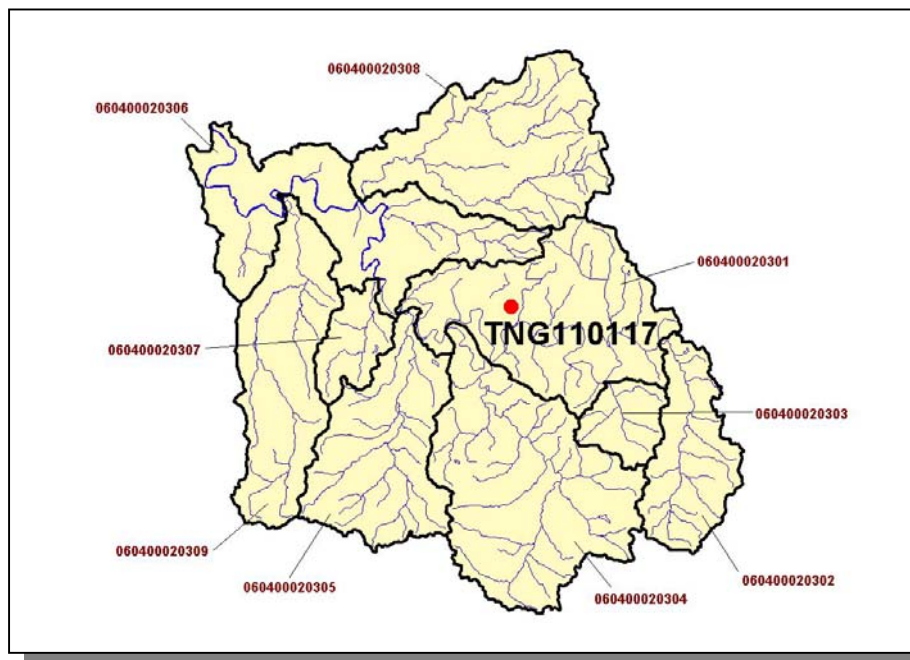


**Figure 4-35. Location of Active Mining Facilities in Subwatershed 0604000203.** Subwatershed 060400020301, 060400020302, 060400020303, 060400020304, 060400020305, 060400020306, 060400020307, 060400020308, and 060400020309 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.

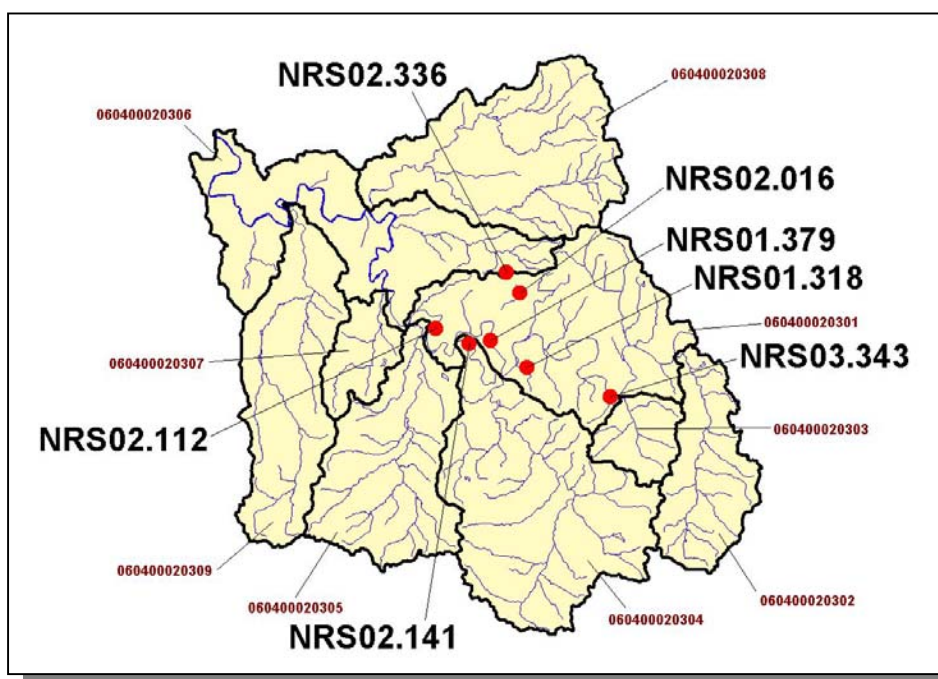




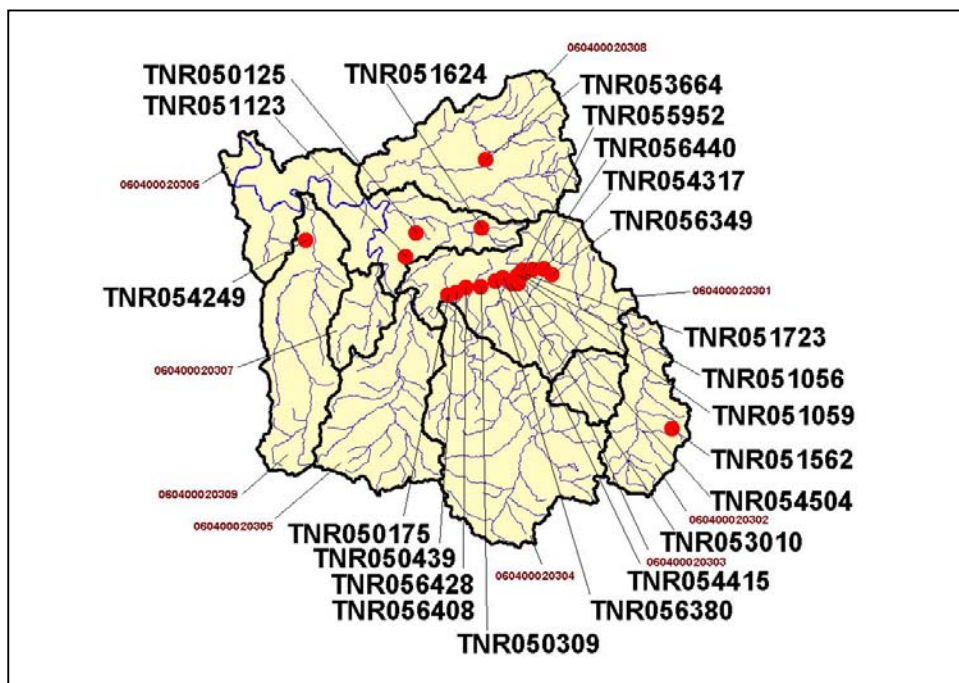
**Figure 4-36. Location of Water Treatment Plants in Subwatershed 0604000203.** Subwatershed 060400020301, 060400020302, 060400020303, 060400020304, 060400020305, 060400020306, 060400020307, 060400020308, and 060400020309 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.



**Figure 4-37. Location of Ready Mix Concrete Plants in Subwatershed 0604000203.** Subwatershed 060400020301, 060400020302, 060400020303, 060400020304, 060400020305, 060400020306, 060400020307, 060400020308, and 060400020309 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.



**Figure 4-38. Location of ARAP Sites (Individual Permits) in Subwatershed 0604000203.** Subwatershed 060400020301, 060400020302, 060400020303, 060400020304, 060400020305, 060400020306, 060400020307, 060400020308, and 060400020309 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.



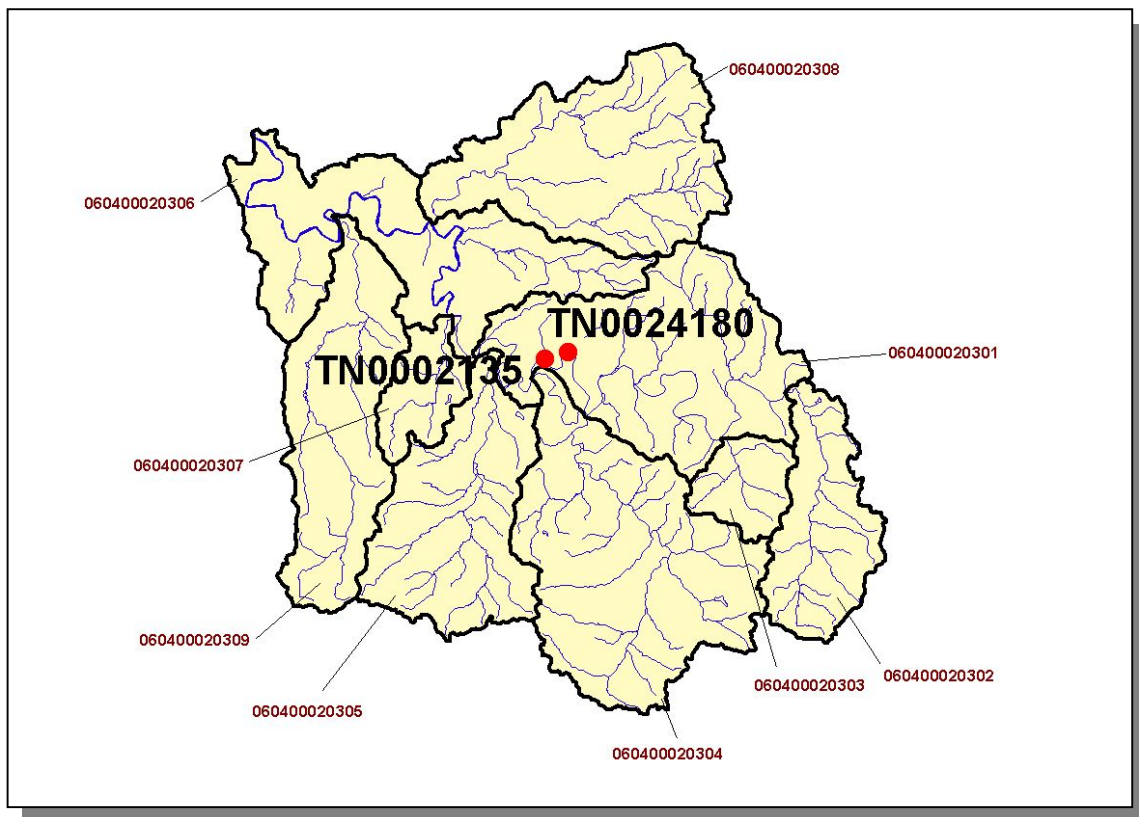
**Figure 4-39. Location of TMSP Facilities in Subwatershed 0604000203.** Subwatershed 060400020301, 060400020302, 060400020303, 060400020304, 060400020305, 060400020306, 060400020307, 060400020308, and 060400020309 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.



**4.2.C.ii.a. Dischargers to Water Bodies Listed on the 2002 303(d) List**

There are two NPDES facilities discharging to water bodies listed on the 2002 303(d) list in Subwatershed 0604000203:

- TN0024180 (Shelbyville STP) discharges to Duck River @ RM 221.3
- TN0002135 (Tyson Foods) discharges to Duck River @ RM 220.5



**Figure 4-40. Location of NPDES Dischargers to Water Bodies Listed on the 2002 303(d) List in Subwatershed 0604000203.** Subwatershed 060400020301, 060400020302, 060400020303, 060400020304, 060400020305, 060400020306, 060400020307, 060400020308, and 060400020309 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.

| PERMIT #  | 1Q10 | 3Q10 | 7Q10 | 3Q20 | QDESIGN |
|-----------|------|------|------|------|---------|
| TN0024180 | 58.6 | 59.6 | 60.8 | 53.8 | 4.9     |
| TN0002135 | 58.6 | 59.6 | 60.8 | 53.8 |         |

**Table 4-21. Receiving Stream Flow Information for NPDES Dischargers to Waterbodies Listed on the 2002 303(d) List in Subwatershed 0604000203.** Data are in million gallons per day (MGD). Data were obtained from the USGS publication Flow Duration and Low Flows of Tennessee Streams Through 1992 or from permit files.

| PERMIT #  | WET | CBOD <sub>5</sub> | FECAL COLIFORM | NH <sub>3</sub> | E. COLI | TRC | TSS | SETTLEABLE SOLIDS | DO | pH |
|-----------|-----|-------------------|----------------|-----------------|---------|-----|-----|-------------------|----|----|
| TN0024180 | X   | X                 | X              |                 | X       | X   | X   | X                 | X  | X  |
| TN0002135 | X   | X                 | X              | X               |         | X   | X   | X                 | X  | X  |

**Table 4-22. Parameters Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2002 303(d) List in Subwatershed 0604000203.** WET, Whole Effluent Toxicity; CBOD<sub>5</sub>, Carbonaceous Biochemical Oxygen Demand (5-Day); TRC, Total Residual Chlorine; TSS, Total Suspended Solids.

**4.2.C.iii.** Nonpoint Source Contributions.

| <b>LIVESTOCK (COUNTS)</b> |        |          |                   |                          |       |       |
|---------------------------|--------|----------|-------------------|--------------------------|-------|-------|
| Beef Cow                  | Cattle | Milk Cow | Chickens (Layers) | Chickens (Broilers Sold) | Hogs  | Sheep |
| 13,302                    | 27,478 | 1,815    | 38                | 12,432,564               | 1,850 | 189   |

**Table 4-23. Summary of Livestock Count Estimates in Subwatershed 0604000203.**  
According to the 1997 Census of Agriculture (<http://www.nass.usda.gov/census/>), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.

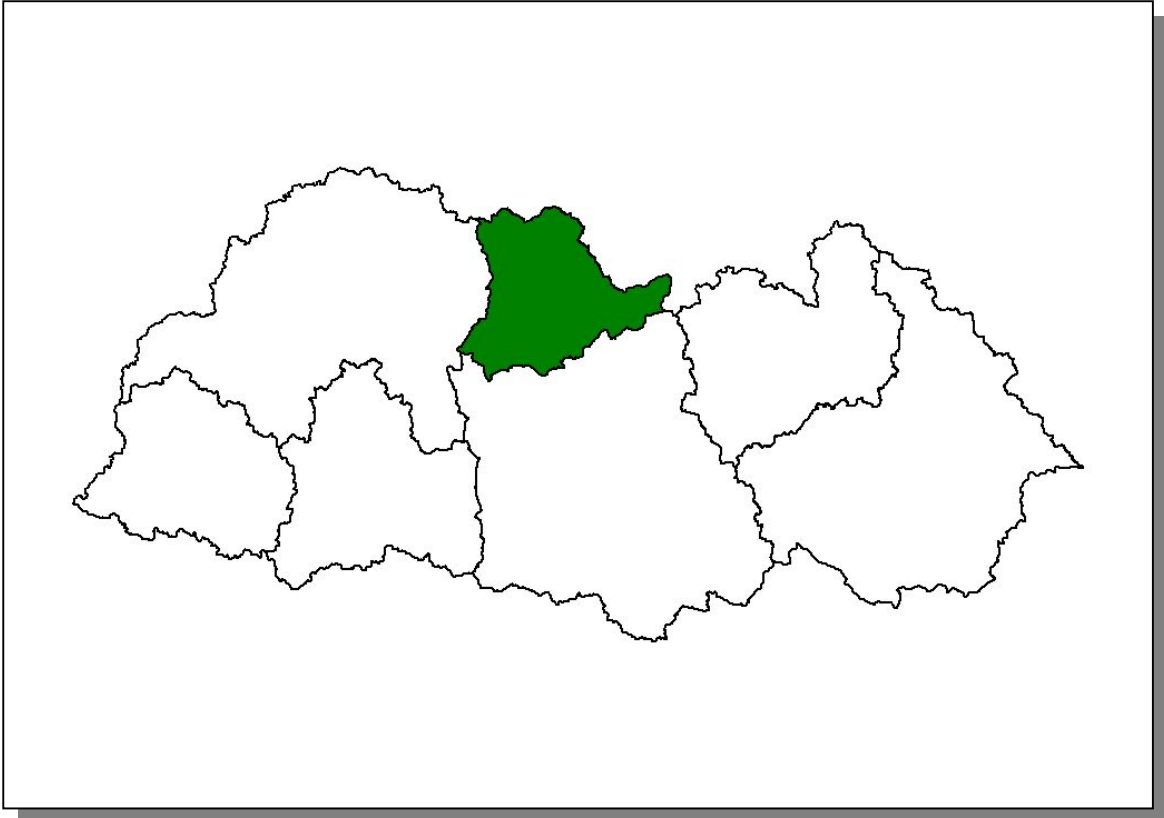
| County        | <b>INVENTORY</b>                |                                 | <b>REMOVAL RATE</b>                   |                                   |
|---------------|---------------------------------|---------------------------------|---------------------------------------|-----------------------------------|
|               | Forest Land<br>(thousand acres) | Timber Land<br>(thousand acres) | Growing Stock<br>(million cubic feet) | Sawtimber<br>(million board feet) |
| Bedford       | 74.6                            | 74.6                            | 0.5                                   | 1.3                               |
| Lincoln       | 136.7                           | 136.7                           | 1.1                                   | 3.2                               |
| Moore         | 36.6                            | 36.6                            | 0.0                                   | 0.0                               |
| <b>Totals</b> | <b>247.9</b>                    | <b>247.9</b>                    | <b>1.6</b>                            | <b>4.5</b>                        |

**Table 4-24. Forest Acreage and Average Annual Removal Rates (1987-1994) in Subwatershed 0604000203.**

| <b>CROPS</b>                          | <b>TONS/ACRE/YEAR</b> |
|---------------------------------------|-----------------------|
| Grass (Pastureland)                   | 0.77                  |
| Grass (Hayland)                       | 1.23                  |
| Legumes (Hayland)                     | 0.30                  |
| Legumes, Grass (Hayland)              | 0.56                  |
| Grass, Forbs, Legumes (Mixed Pasture) | 0.48                  |
| Forest Land (Not Grazed)              | 0.00                  |
| Forest Land (Grazed)                  | 0.00                  |
| Corn (Row Crops)                      | 4.29                  |
| Potatoes (Row Crops)                  | 3.04                  |
| Soybeans (Row Crops)                  | 6.09                  |
| Tobacco (Row Crops)                   | 9.27                  |
| Wheat (Close-Grown Cropland)          | 2.26                  |
| Other Vegetable and Truck Crop        | 2.52                  |
| Summer Fallow (Other Cropland)        | 4.62                  |
| Other Cropland not Planted            | 0.23                  |
| Other Lands in Farms                  | 0.21                  |
| Conservation Reserve Program Lands    | 0.33                  |
| Non-Agricultural Land Use             | 0.00                  |
| Farmsteads and Ranch Headquarters     | 0.05                  |

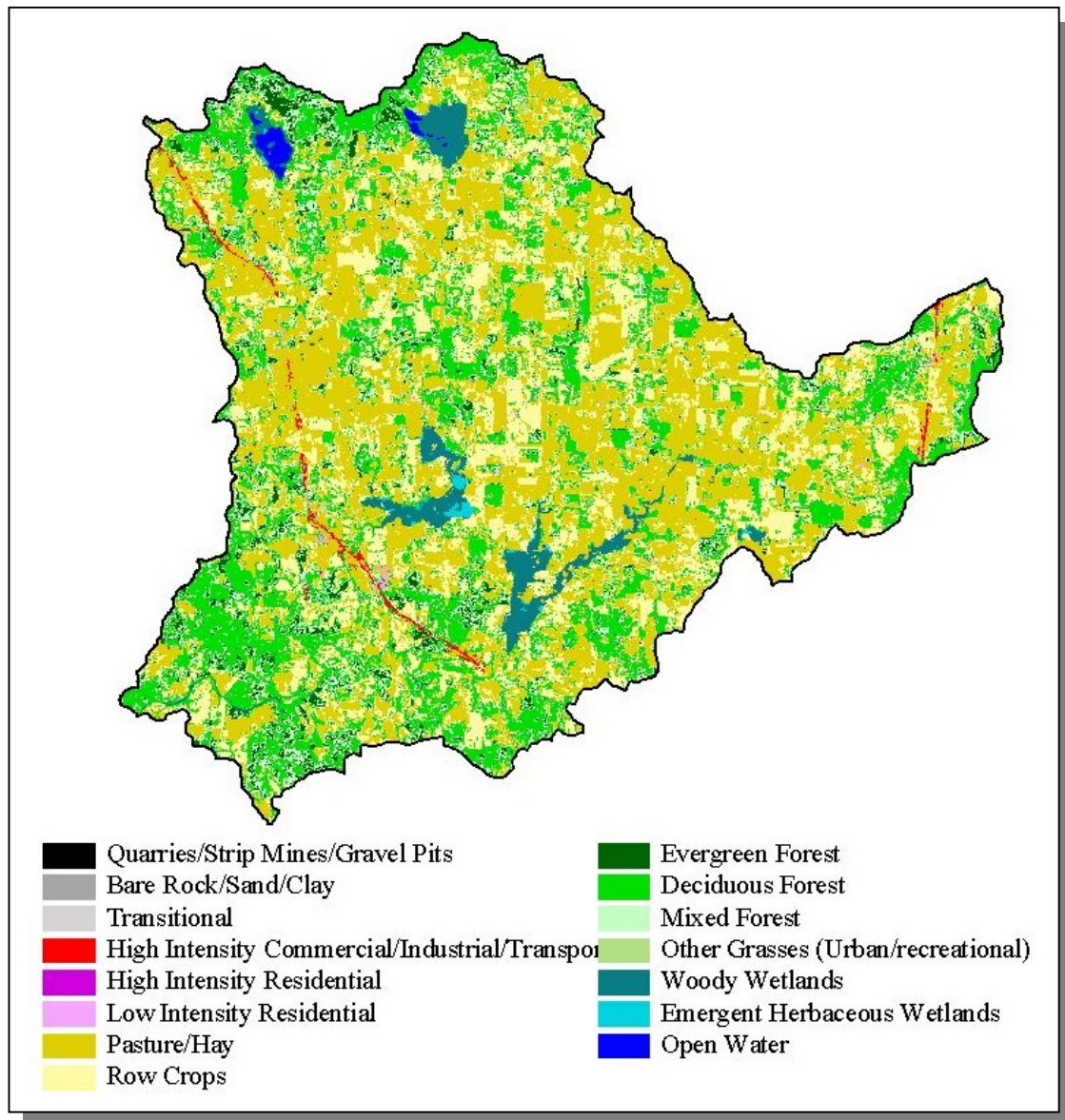
**Table 4-25. Annual Estimated Total Soil Loss in Subwatershed 0604000203.**

**4.2.D. 0604000204 (North Fork Creek).**

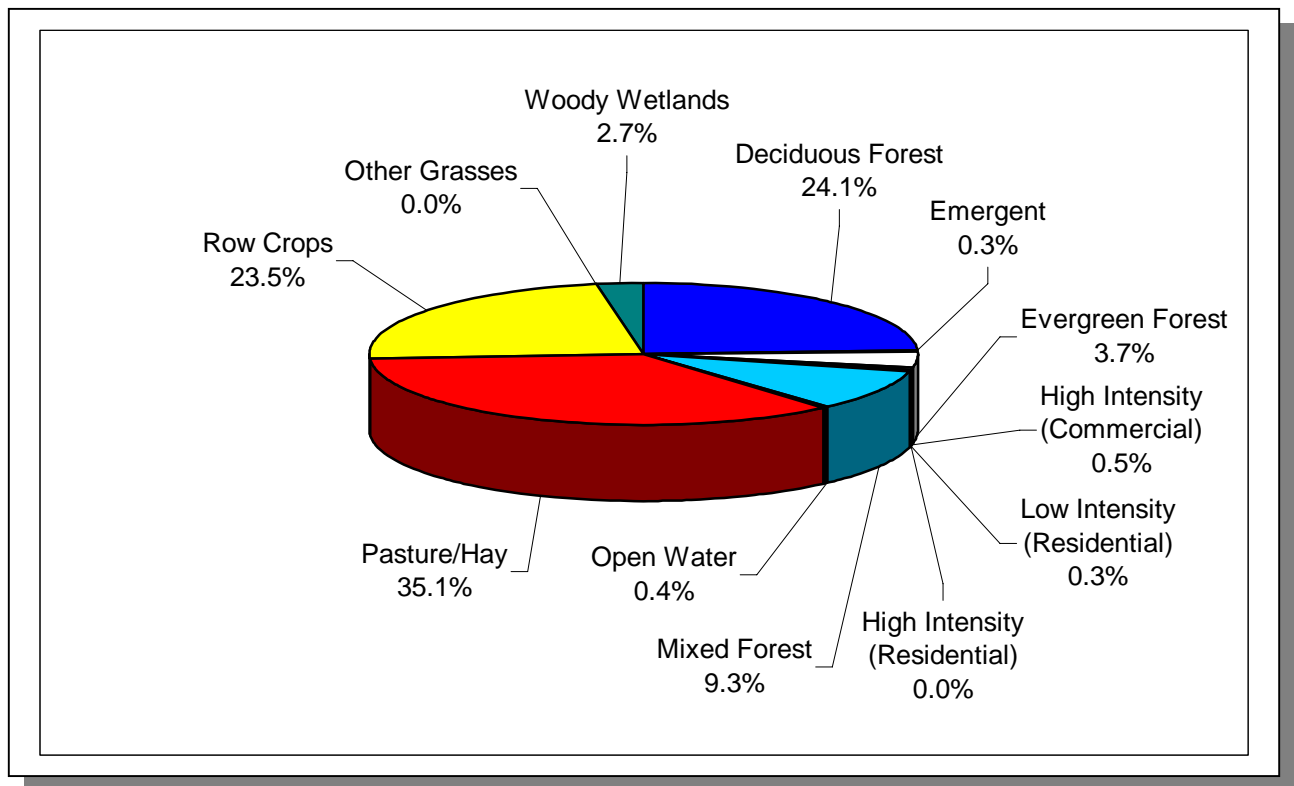


**Figure 4-41. Location of Subwatershed 0604000204.** All Upper Duck HUC-10 subwatershed boundaries are shown for reference.

4.2.D.i. General Description.

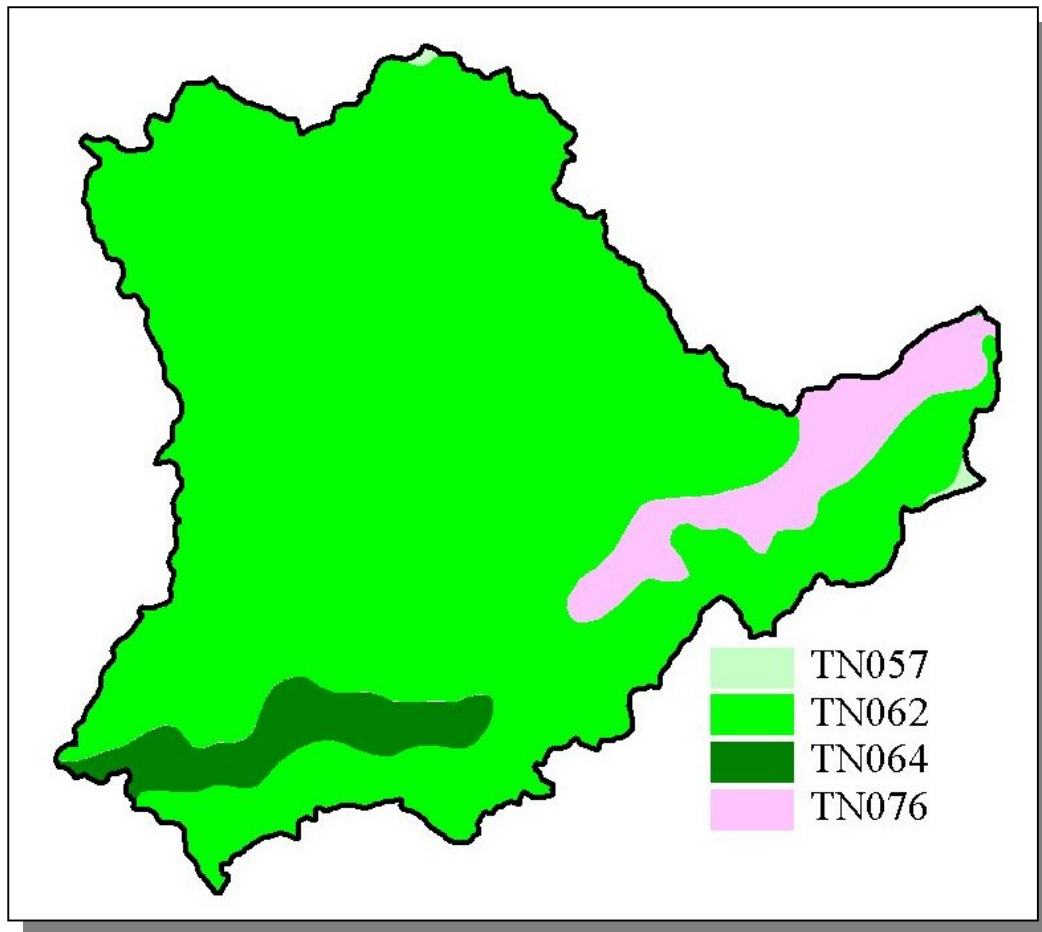


*Figure 4-42. Illustration of Land Use Distribution in Subwatershed 0604000204.*



**Figure 4-43. Land Use Distribution in Subwatershed 0604000204.** More information is provided in Appendix IV.





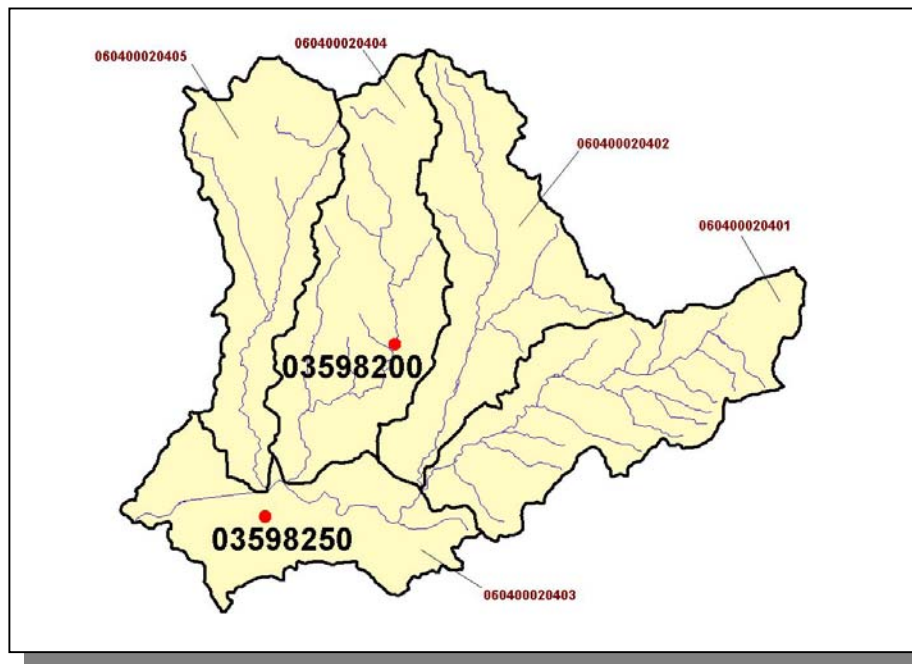
**Figure 4-44. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0604000204.**

| STATSGO<br>MAP UNIT ID | PERCENT<br>HYDRIC | HYDROLOGIC<br>GROUP | PERMEABILITY<br>(in/hour) | SOIL<br>pH | ESTIMATED<br>SOIL TEXTURE | SOIL<br>ERODIBILITY |
|------------------------|-------------------|---------------------|---------------------------|------------|---------------------------|---------------------|
| TN057                  | 0.00              | C                   | 1.14                      | 5.01       | Clayey Loam               | 0.33                |
| TN062                  | 0.00              | C                   | 0.98                      | 4.40       | Clayey Loam               | 0.26                |
| TN064                  | 7.00              | C                   | 1.19                      | 5.82       | Silty Loam                | 0.37                |
| TN076                  | 28.00             | C                   | 0.73                      | 6.26       | Silty Loam                | 0.33                |

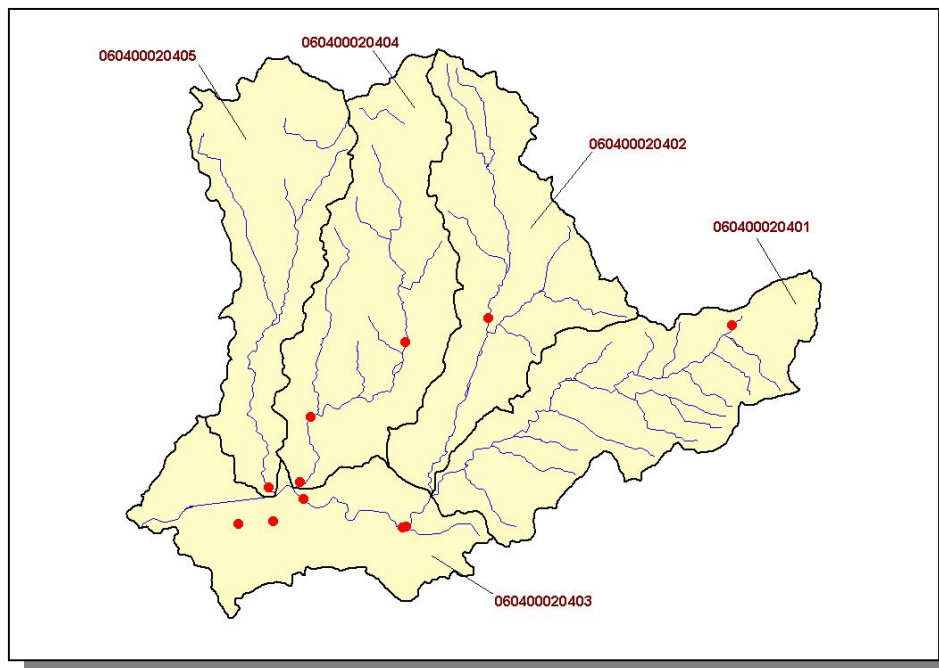
**Table 4-26. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0604000204.** More information is provided in Appendix IV.

| County        | COUNTY<br>POPULATION |                |                | Portion of<br>Watershed (%) | ESTIMATED POPULATION<br>IN WATERSHED |              |              | % Change<br>(1990-1997) |
|---------------|----------------------|----------------|----------------|-----------------------------|--------------------------------------|--------------|--------------|-------------------------|
|               | 1990                 | 1997           | 2000           |                             | 1990                                 | 1997         | 2000         |                         |
| Bedford       | 30,411               | 34,203         | 37,586         | 16.18                       | 4,920                                | 5,533        | 6,081        | 23.6                    |
| Rutherford    | 118,570              | 159,987        | 182,023        | 0.6                         | 711                                  | 960          | 1,092        | 53.6                    |
| <b>Totals</b> | <b>170,520</b>       | <b>219,877</b> | <b>246,376</b> |                             | <b>5,631</b>                         | <b>6,493</b> | <b>7,173</b> | <b>27.4</b>             |

*Table 4-27. Population Estimates in Subwatershed 0604000204.*

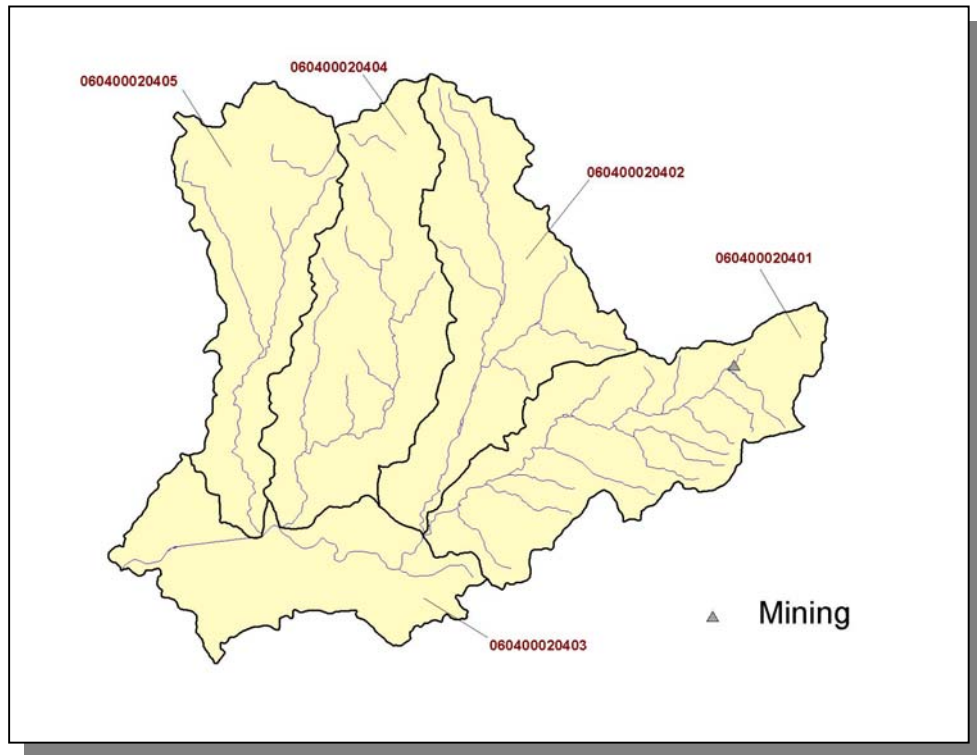


**Figure 4-45. Location of Historical Streamflow Data Collection Sites in Subwatershed 0604000204.** Subwatershed 060400020401, 060400020402, 060400020403, 060400020404, and 060400020405 boundaries are shown for reference. More information is provided in Appendix IV.

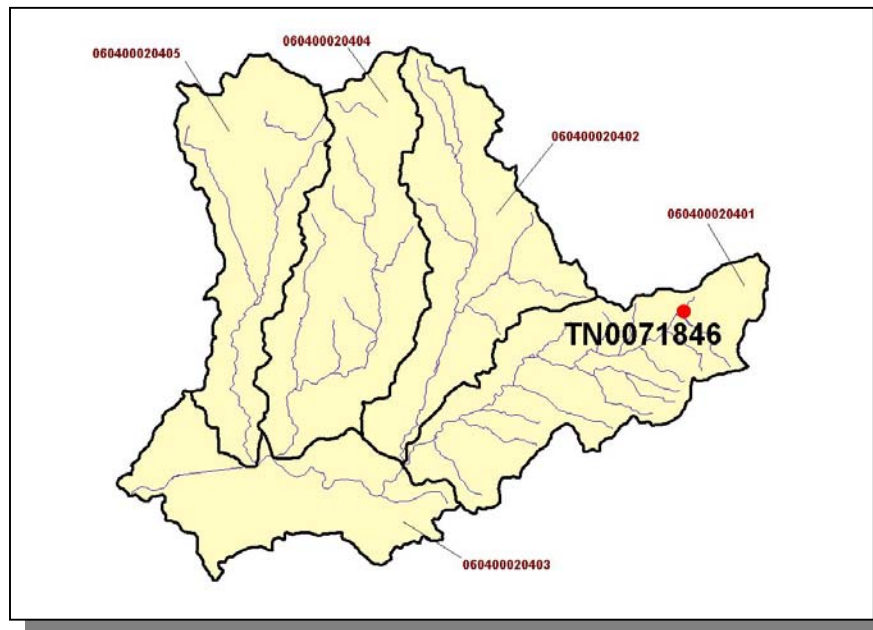


**Figure 4-46. Location of STORET Monitoring Sites in Subwatershed 0604000204.** Subwatershed 060400020401, 060400020402, 060400020403, 060400020404, and 060400020405 boundaries are shown for reference. More information, including site names and locations, is provided in Appendix IV.

**4.2.D.ii.** Point Source Contributions.



**Figure 4-47. Location of Active Point Source Facilities in Subwatershed 0604000204.** Subwatershed 060400020401, 060400020402, 060400020403, 060400020404, and 060400020405 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.



**Figure 4-48. Location of Active Mining Facilities in Subwatershed 0604000204.** Subwatershed 060400020401, 060400020402, 060400020403, 060400020404, and 060400020405 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.

**4.2.D.iii. Nonpoint Source Contributions.**

| <b>LIVESTOCK (COUNTS)</b> |          |        |                   |                          |      |       |
|---------------------------|----------|--------|-------------------|--------------------------|------|-------|
| Beef Cow                  | Milk Cow | Cattle | Chickens (Layers) | Chickens (Broilers Sold) | Hogs | Sheep |
| 4,806                     | 659      | 9,952  | 14                | 4,428,225                | 674  | 71    |

**Table 4-28. Summary of Livestock Count Estimates in Subwatershed 0604000204.**  
According to the 1997 Census of Agriculture (<http://www.nass.usda.gov/census/>), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.

| County  | <b>INVENTORY</b>                |                                 | <b>REMOVAL RATE</b>                   |                                   |
|---------|---------------------------------|---------------------------------|---------------------------------------|-----------------------------------|
|         | Forest Land<br>(thousand acres) | Timber Land<br>(thousand acres) | Growing Stock<br>(million cubic feet) | Sawtimber<br>(million board feet) |
| Bedford | 74.6                            | 74.6                            | 0.5                                   | 1.3                               |

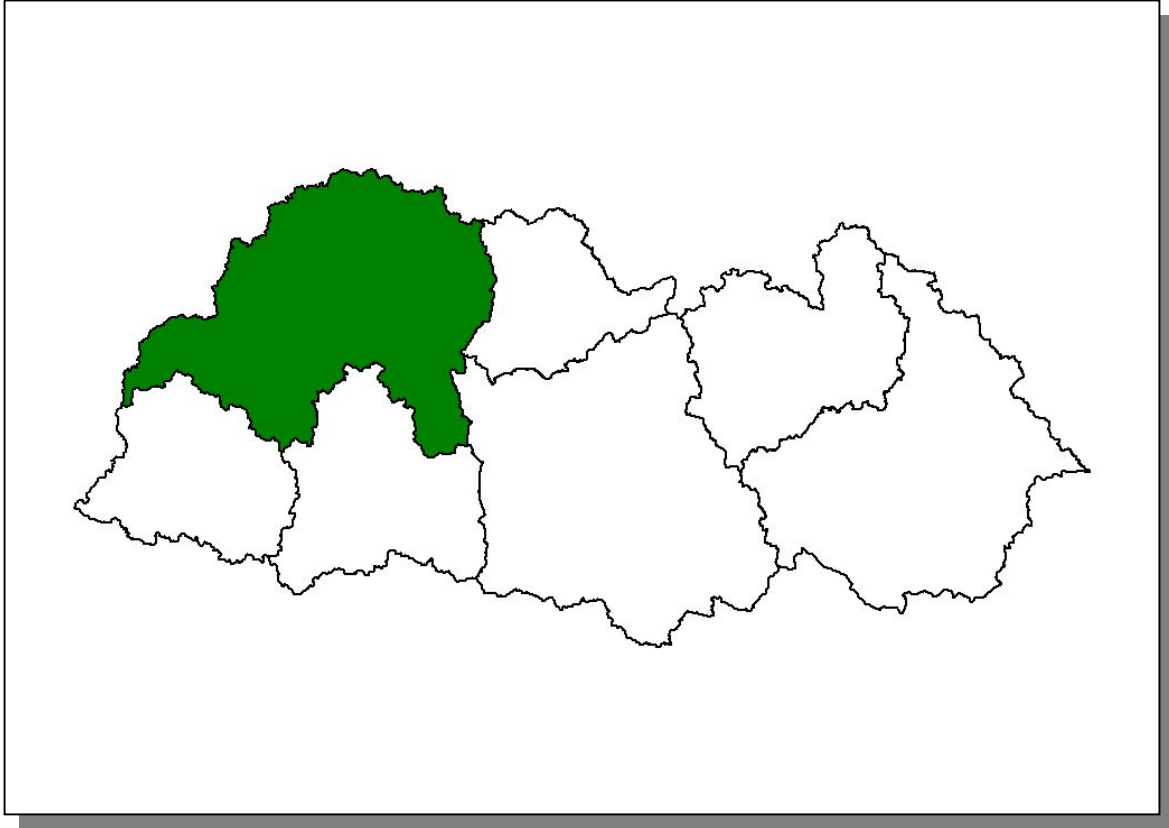
**Table 4-29. Forest Acreage and Average Annual Removal Rates (1987-1994) in Subwatershed 0604000204.**

| <b>CROPS</b>                          | <b>TONS/ACRE/YEAR</b> |
|---------------------------------------|-----------------------|
| Legumes (Pastureland)                 | 0.12                  |
| Grass (Pastureland)                   | 0.73                  |
| Grass (Hayland)                       | 1.19                  |
| Legumes (Hayland)                     | 0.32                  |
| Legumes, Grass (Hayland)              | 0.56                  |
| Grass, Forbs, Legumes (Mixed Pasture) | 0.42                  |
| Forest Land (Not Grazed)              | 0.00                  |
| Forest Land (Grazed)                  | 0.00                  |
| Corn (Row Crops)                      | 4.25                  |
| Cotton (Row Crops)                    | 4.79                  |
| Soybeans (Row Crops)                  | 5.93                  |
| Wheat (Close-Grown Cropland)          | 2.22                  |
| Summer Fallow (Other Cropland)        | 4.60                  |
| Other Cropland not Planted            | 0.23                  |
| Berry (Horticulture)                  | 0.47                  |
| Conservation Reserve Program Lands    | 0.33                  |
| Non-Agricultural Land Use             | 0.00                  |
| Other Lands in Farm                   | 0.05                  |
| Farmsteads and Ranch Headquarters     | 0.06                  |

**Table 4-30. Annual Soil Loss in Subwatershed 0604000204.**

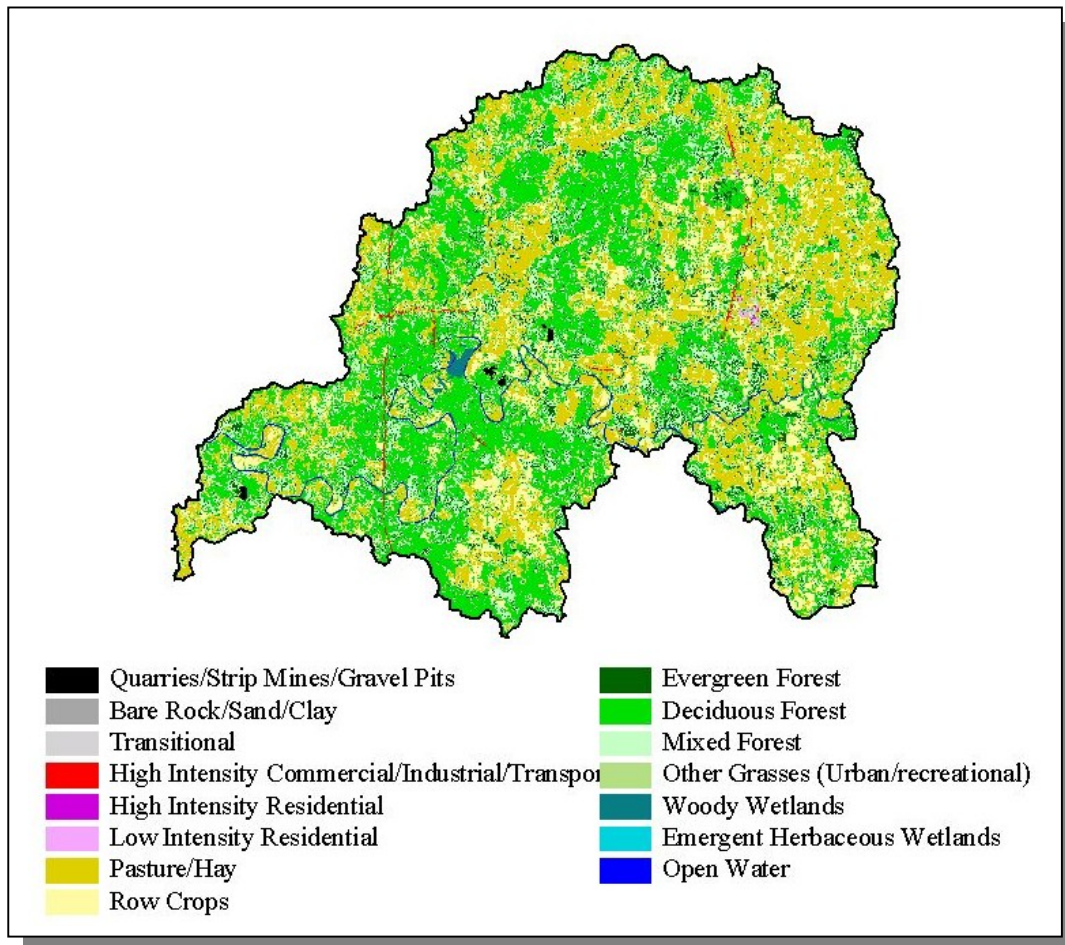


**4.2.E. 0604000205 (Duck River).**

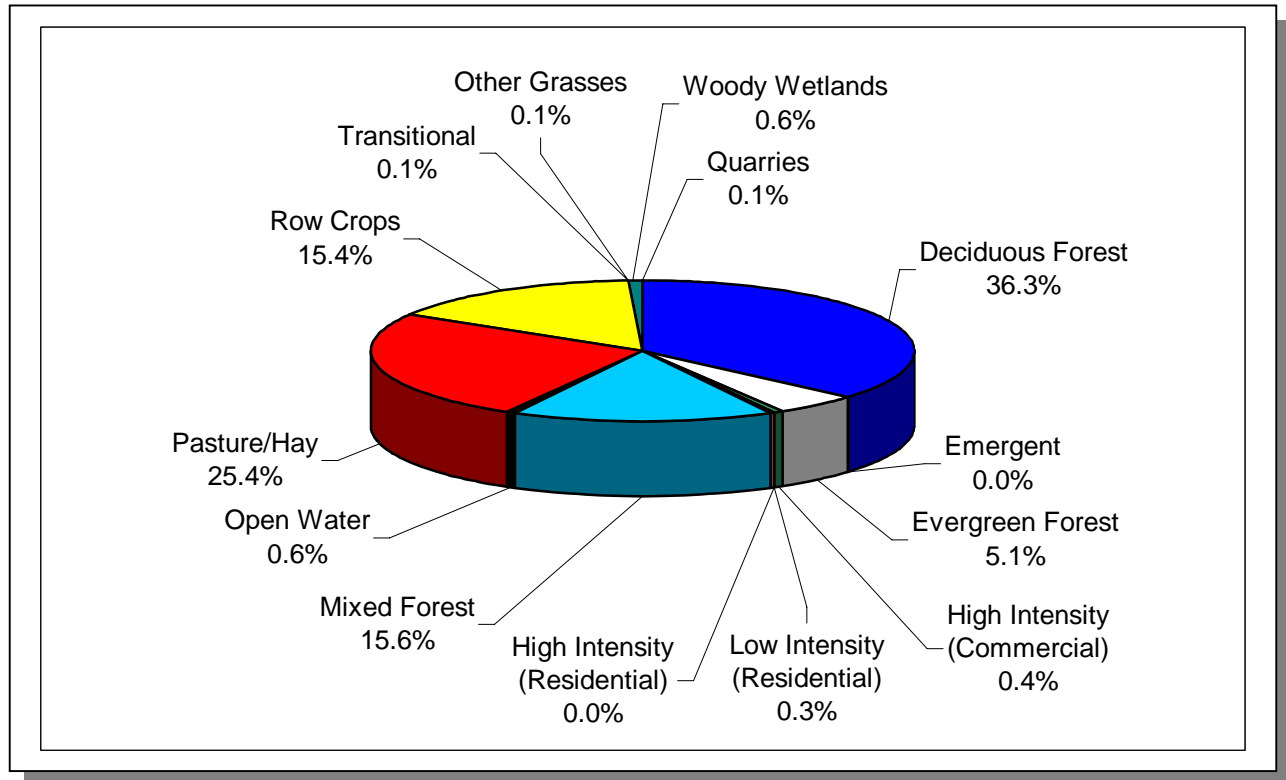


**Figure 4-49. Location of Subwatershed 0604000205.** All Upper Duck HUC-10 subwatershed boundaries are shown for reference.

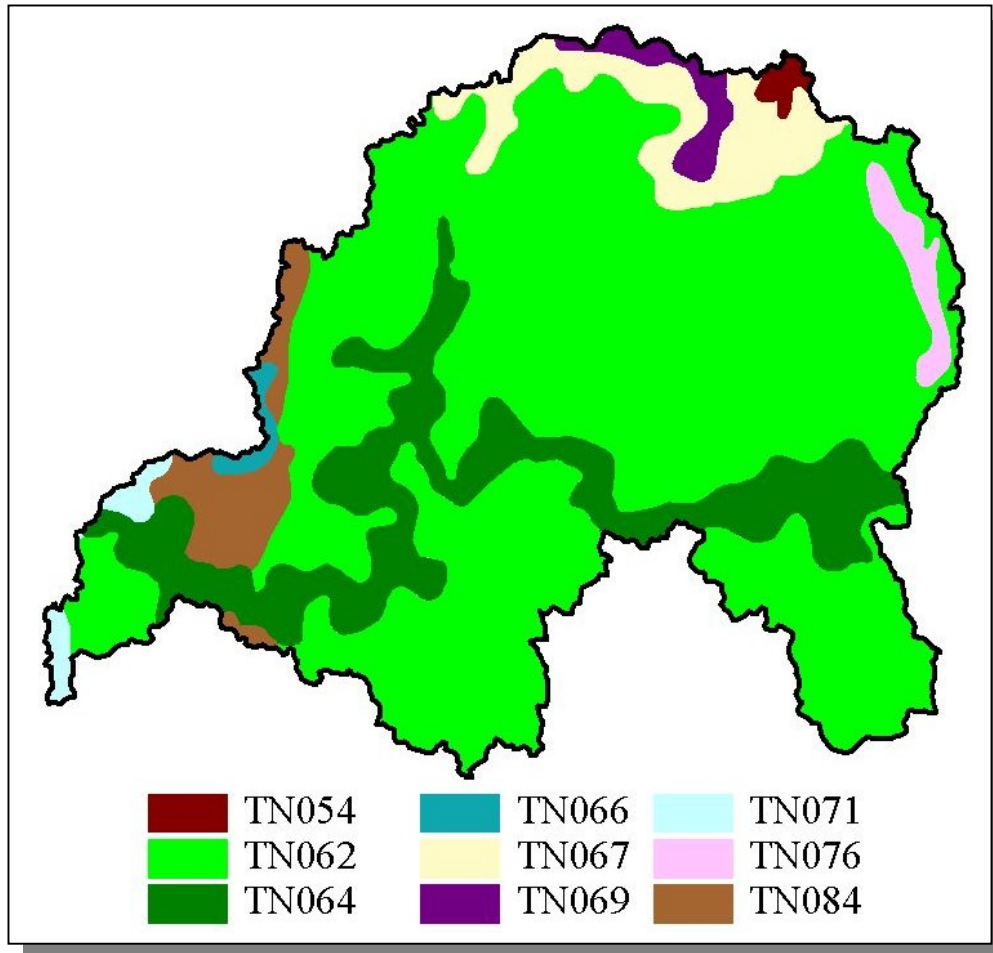
4.2.E.i. General Description.



*Figure 4-50. Illustration of Land Use Distribution in Subwatershed 0604000205.*



**Figure 4-51. Land Use Distribution in Subwatershed 0604000205.** More information is provided in Appendix IV.



**Figure 4-52. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0604000205.**

| STATSGO<br>MAP UNIT ID | PERCENT<br>HYDRIC | HYDROLOGIC<br>GROUP | PERMEABILITY<br>(in/hr) | SOIL<br>pH | ESTIMATED<br>SOIL TEXTURE | SOIL<br>ERODIBILITY |
|------------------------|-------------------|---------------------|-------------------------|------------|---------------------------|---------------------|
| TN054                  | 0.00              | C                   | 3.04                    | 4.84       | Loam                      | 0.32                |
| TN062                  | 0.00              | C                   | 0.98                    | 4.40       | Clayey Loam               | 0.26                |
| TN064                  | 7.00              | C                   | 1.19                    | 5.82       | Silty Loam                | 0.37                |
| TN066                  | 0.00              | B                   | 2.62                    | 4.75       | Loam                      | 0.28                |
| TN067                  | 2.00              | C                   | 2.69                    | 5.51       | Silty Loam                | 0.35                |
| TN069                  | 0.00              | C                   | 2.06                    | 5.36       | Loam                      | 0.34                |
| TN071                  | 0.00              | C                   | 2.37                    | 5.70       | Silty Loam                | 0.33                |
| TN076                  | 28.00             | C                   | 0.73                    | 6.26       | Silty Clayey Loam         | 0.33                |
| TN084                  | 0.00              | C                   | 1.80                    | 4.99       | Silty Loam                | 0.28                |

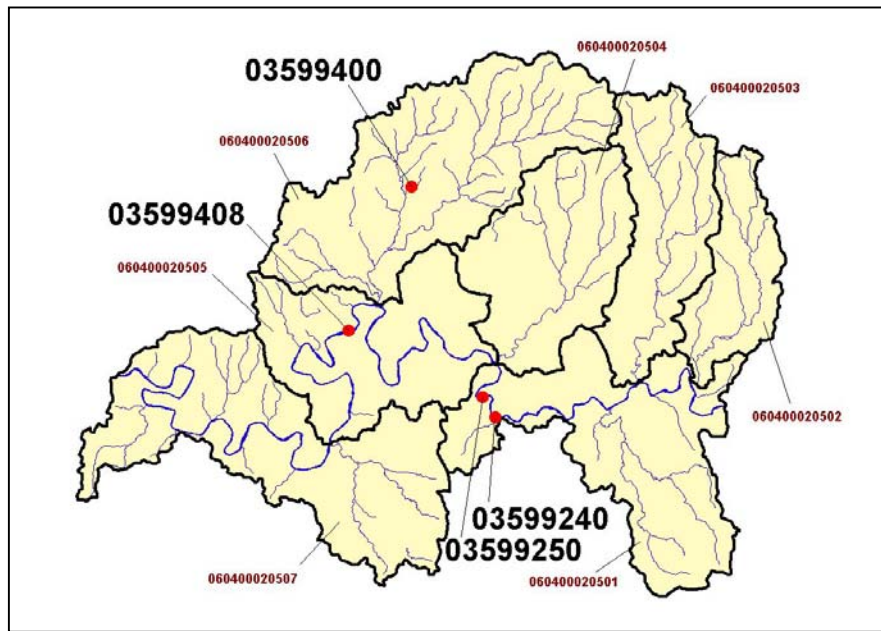
**Table 4-31. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0604000205.** More information is provided in Appendix IV.

| County        | COUNTY POPULATION |                |                | Portion of Watershed (%) | ESTIMATED POPULATION IN WATERSHED |               |               | % Change (1990-1997) |
|---------------|-------------------|----------------|----------------|--------------------------|-----------------------------------|---------------|---------------|----------------------|
|               | 1990              | 1997           | 2000           |                          | 1990                              | 1997          | 2000          |                      |
| Bedford       | 30,411            | 34,203         | 37,586         | 2.41                     | 733                               | 825           | 906           | 23.6                 |
| Marshall      | 21,539            | 25,687         | 26,767         | 13.37                    | 7,188                             | 8,573         | 8,933         | 24.3                 |
| Maury         | 54,812            | 68,268         | 69,498         | 14.86                    | 8,145                             | 10,144        | 10,327        | 26.8                 |
| Rutherford    | 118,570           | 159,987        | 182,023        | 0.6                      | 717                               | 968           | 1,101         | 53.6                 |
| Williamson    | 81,021            | 111,453        | 126,638        | 2.42                     | 1,961                             | 2,698         | 3,066         | 56.3                 |
| <b>Totals</b> | <b>306,353</b>    | <b>399,598</b> | <b>442,512</b> |                          | <b>18,744</b>                     | <b>23,208</b> | <b>24,333</b> | <b>29.8</b>          |

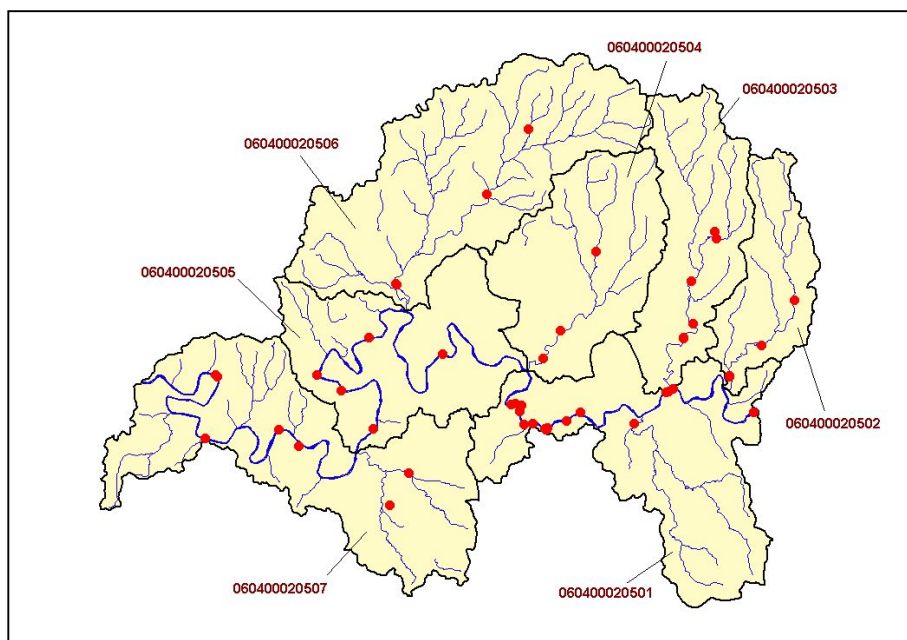
*Table 4-32. Population Estimates in Subwatershed 0604000205.*

| Populated Place | County     | Population    | NUMBER OF HOUSING UNITS |               |              |           |
|-----------------|------------|---------------|-------------------------|---------------|--------------|-----------|
|                 |            |               | Total                   | Public Sewer  | Septic Tank  | Other     |
| Chapel Hill     | Marshall   | 833           | 346                     | 336           | 8            | 2         |
| Columbia        | Maury      | 28,583        | 12,142                  | 11,303        | 826          | 13        |
| Eagleville      | Rutherford | 491           | 220                     | 5             | 211          | 4         |
| <b>Totals</b>   |            | <b>29,907</b> | <b>12,708</b>           | <b>11,644</b> | <b>1,045</b> | <b>19</b> |

*Table 4-33. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 0604000205.*



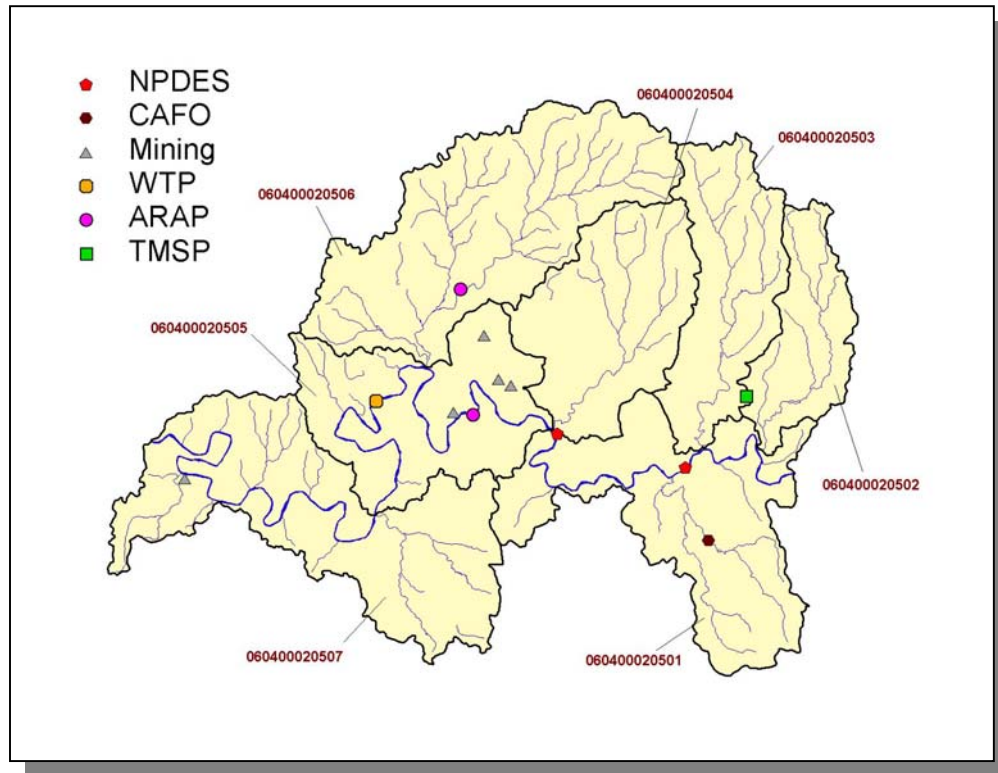
**Figure 4-53. Location of Historical Streamflow Data Collection Sites in Subwatershed 0604000205.** Subwatershed 060400020501, 060400020502, 060400020503, 060400020504, 060400020505, 060400020506, and 060400020507 boundaries are shown for reference. More information is provided in Appendix IV.



**Figure 4-54. Location of STORET Monitoring Sites in Subwatershed 0604000205.** Subwatershed 060400020501, 060400020502, 060400020503, 060400020504, 060400020505, 060400020506, and 060400020507 boundaries are shown for reference. More information, including site names and locations, is provided in Appendix IV.



**4.2.E.ii.** Point Source Contributions.



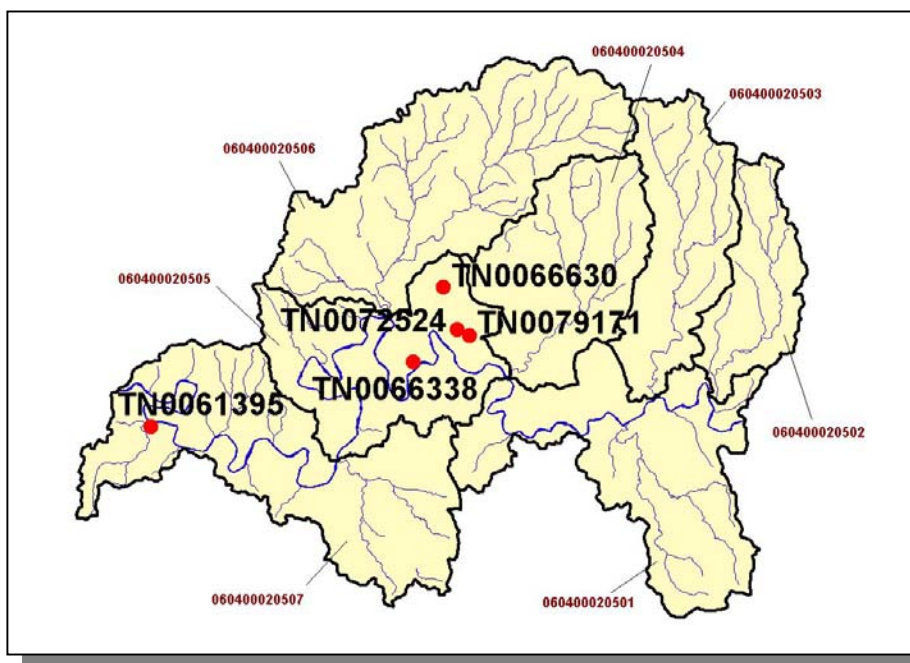
**Figure 4-55. Location of Active Point Source Facilities in Subwatershed 0604000205.** Subwatershed 060400020501, 060400020502, 060400020503, 060400020504, 060400020505, 060400020506, and 060400020507 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.



**Figure 4-56. Location of NPDES Facilities in Subwatershed 0604000205.** Subwatershed 060400020501, 060400020502, 060400020503, 060400020504, 060400020505, 060400020506, and 060400020507 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.



**Figure 4-57. Location of Concentrated Animal Feeding Operations (CAFO) in Subwatershed 0604000205.** Subwatershed 060400020501, 060400020502, 060400020503, 060400020504, 060400020505, 060400020506, and 060400020507 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.



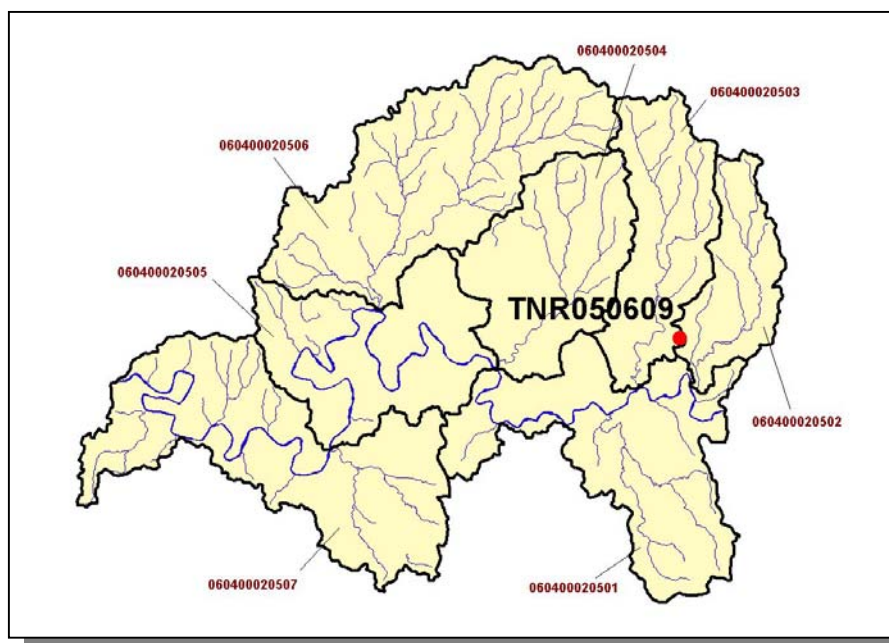
**Figure 4-58. Location of Active Mining Facilities in Subwatershed 0604000205.** Subwatershed 060400020501, 060400020502, 060400020503, 060400020504, 060400020505, 060400020506, and 060400020507 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.



**Figure 4-59. Location of Water Treatment Plants in Subwatershed 0604000205.** Subwatershed 060400020501, 060400020502, 060400020503, 060400020504, 060400020505, 060400020506, and 060400020507 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.



**Figure 4-60. Location of ARAP Sites (Individual Permits) in Subwatershed 0604000205.** Subwatershed 060400020501, 060400020502, 060400020503, 060400020504, 060400020505, 060400020506, and 060400020507 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.



**Figure 4-61. Location of TMSP Facilities in Subwatershed 0604000205.** Subwatershed 060400020501, 060400020502, 060400020503, 060400020504, 060400020505, 060400020506, and 060400020507 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.



**4.2.E.iii. Nonpoint Source Contributions.**

| <b>LIVESTOCK (COUNTS)</b> |          |        |                   |                          |       |       |
|---------------------------|----------|--------|-------------------|--------------------------|-------|-------|
| Beef Cow                  | Milk Cow | Cattle | Chickens (Layers) | Chickens (Broilers Sold) | Hogs  | Sheep |
| 13,283                    | 2,135    | 28,226 | 36                | 636,949                  | 1,641 | 198   |

**Table 4-34. Summary of Livestock Count Estimates in Subwatershed 0604000205.** According to the 1997 Census of Agriculture (<http://www.nass.usda.gov/census/>), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.

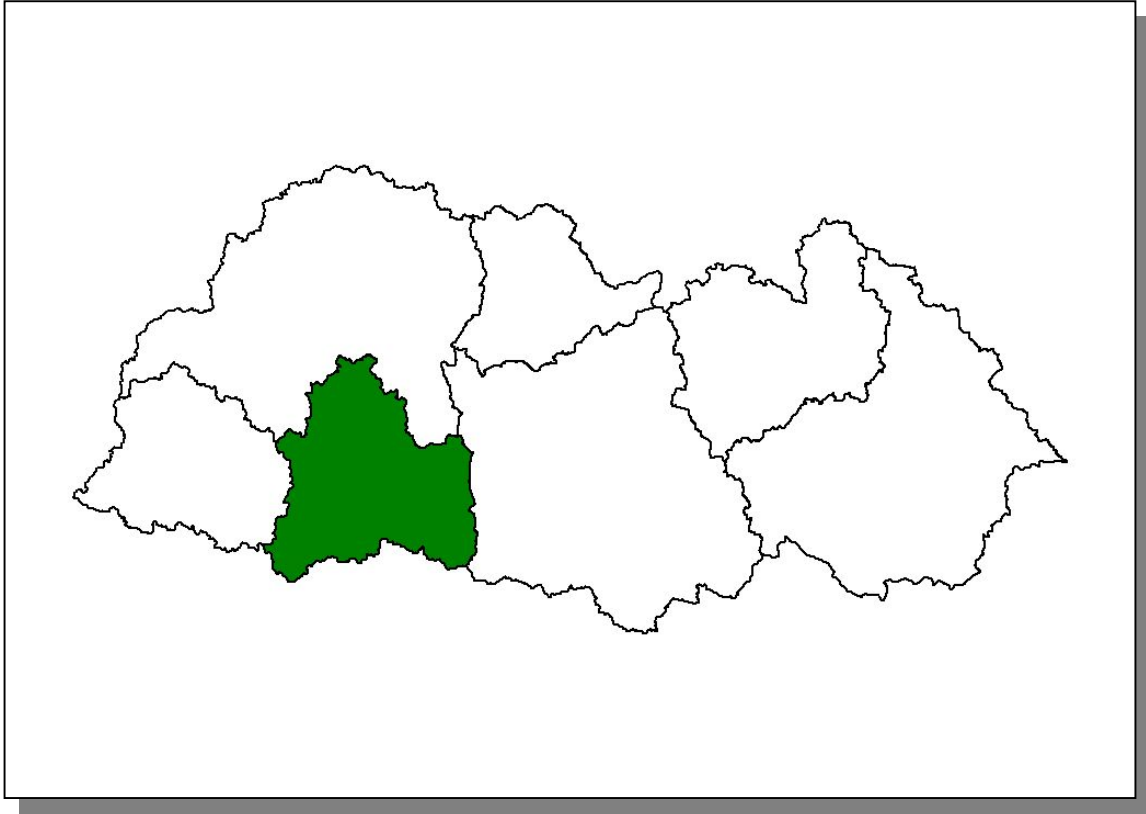
| County  | <b>INVENTORY</b>             |                              | <b>REMOVAL RATE</b>                |                                |
|---------|------------------------------|------------------------------|------------------------------------|--------------------------------|
|         | Forest Land (thousand acres) | Timber Land (thousand acres) | Growing Stock (million cubic feet) | Sawtimber (million board feet) |
| Bedford | 74.6                         | 74.6                         | 0.5                                | 1.3                            |

**Table 4-35. Forest Acreage and Annual Removal Rates (1987-1994) in Subwatershed 0604000205.**

| <b>CROPS</b>                          | <b>TONS/ACRE/YEAR</b> |
|---------------------------------------|-----------------------|
| Legumes (Pastureland)                 | 0.29                  |
| Grass (Pastureland)                   | 0.71                  |
| Grass (Hayland)                       | 0.36                  |
| Legumes (Hayland)                     | 0.62                  |
| Legumes, Grass (Hayland)              | 1.37                  |
| Grass, Forbs, Legumes (Mixed Pasture) | 0.47                  |
| Forest Land (Not Grazed)              | 0.00                  |
| Forest Land (Grazed)                  | 0.00                  |
| Corn (Row Crops)                      | 7.07                  |
| Cotton (Row Crops)                    | 4.79                  |
| Soybeans (Row Crops)                  | 6.39                  |
| Tobacco (Row Crops)                   | 6.75                  |
| All Other Row Crops                   | 11.45                 |
| Wheat (Close-Grown Cropland)          | 7.00                  |
| Summer Fallow (Other Cropland)        | 8.40                  |
| Other Cropland not Planted            | 2.30                  |
| Berry (Horticulture)                  | 0.47                  |
| Conservation Reserve Program Lands    | 0.28                  |
| Non-Agricultural Land Use             | 0.00                  |
| Other Land in Farms                   | 0.06                  |
| Farmsteads and Ranch Headquarters     | 0.22                  |

**Table 4-36. Annual Estimated Soil Loss in Subwatershed 0604000205.**

**4.2.F. 0604000206 (Rock Creek).**



**Figure 4-62. Location of Subwatershed 0604000206.** All Upper Duck HUC-10 subwatershed boundaries are shown for reference.



4.2.F.i. General Description.

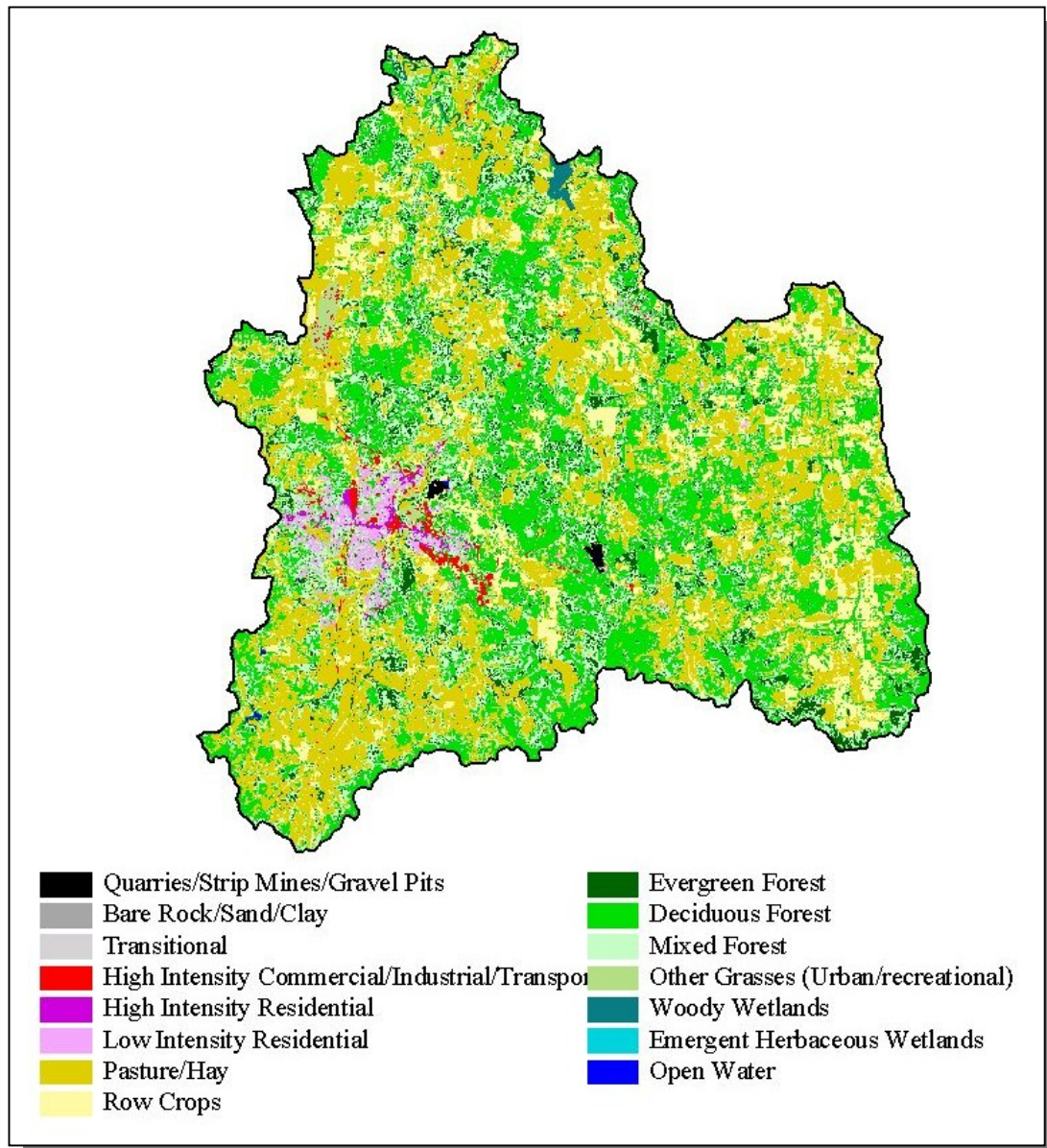
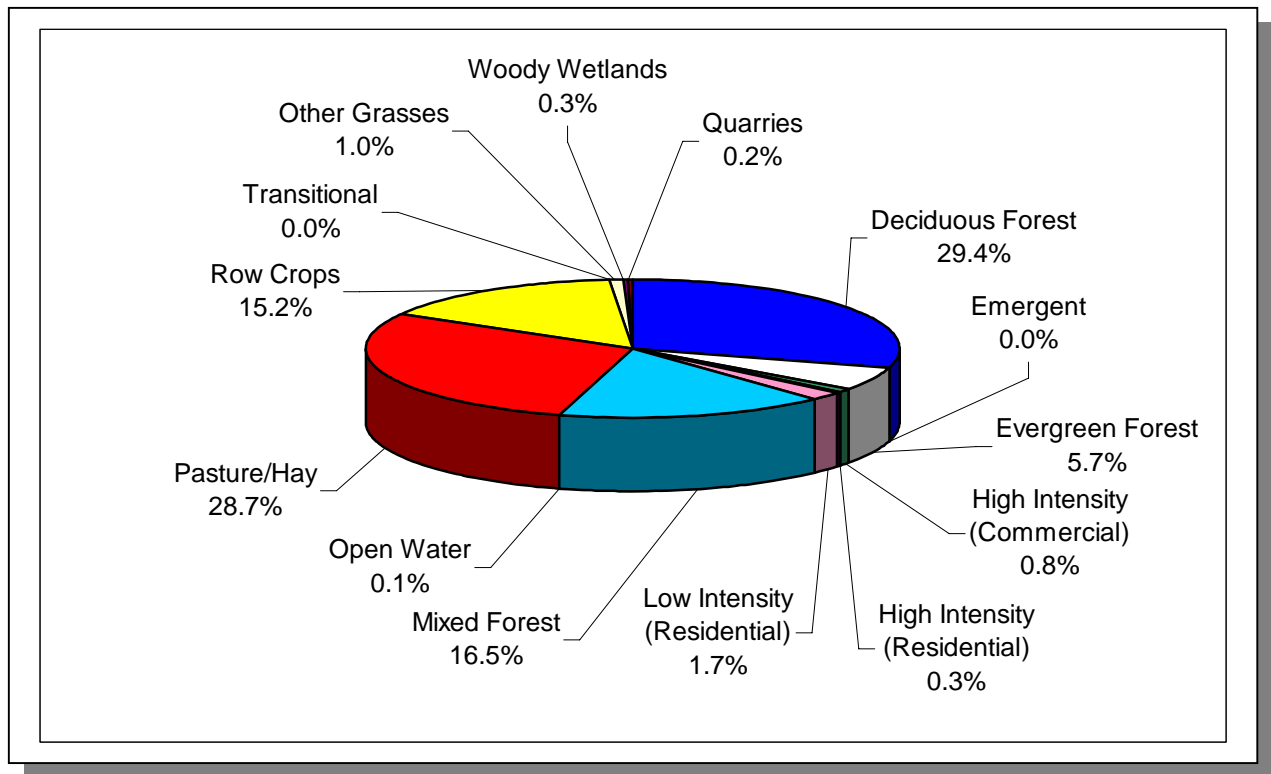
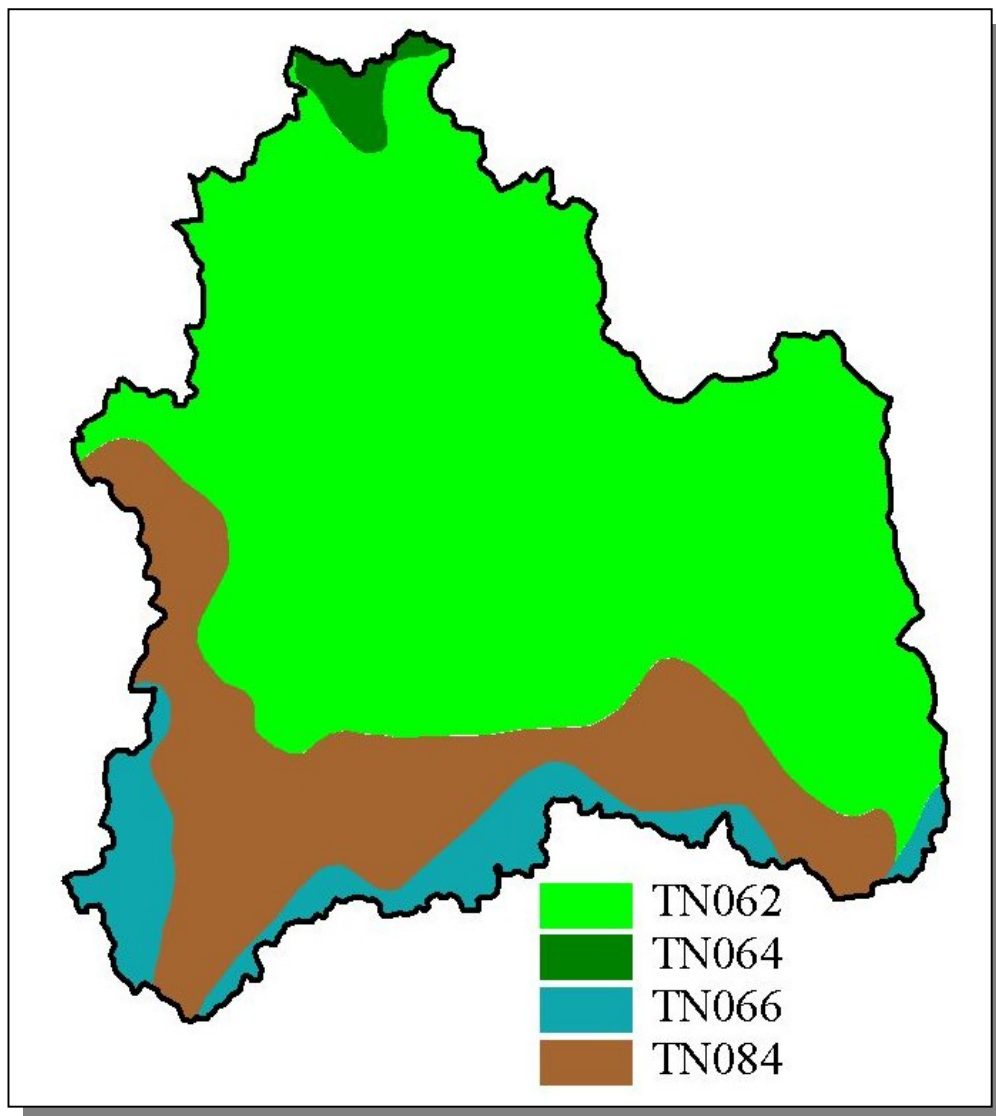


Figure 4-63. Illustration of Land Use Distribution in Subwatershed 0604000206.



**Figure 4-64. Land Use Distribution in Subwatershed 0604000206.** More information is provided in Appendix IV.



**Figure 4-65. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0604000206.**

| STATSGO<br>MAP UNIT ID | PERCENT<br>HYDRIC | HYDROLOGIC<br>GROUP | PERMEABILITY<br>(in/hr) | SOIL<br>pH | ESTIMATED<br>SOIL TEXTURE | SOIL<br>ERODIBILITY |
|------------------------|-------------------|---------------------|-------------------------|------------|---------------------------|---------------------|
| TN062                  | 0.00              | C                   | 0.98                    | 4.40       | Clayey Loam               | 0.26                |
| TN064                  | 7.00              | C                   | 1.19                    | 5.82       | Silty Loam                | 0.37                |
| TN066                  | 0.00              | B                   | 2.62                    | 4.75       | Loam                      | 0.28                |
| TN084                  | 0.00              | C                   | 1.80                    | 4.99       | Silty Loam                | 0.28                |

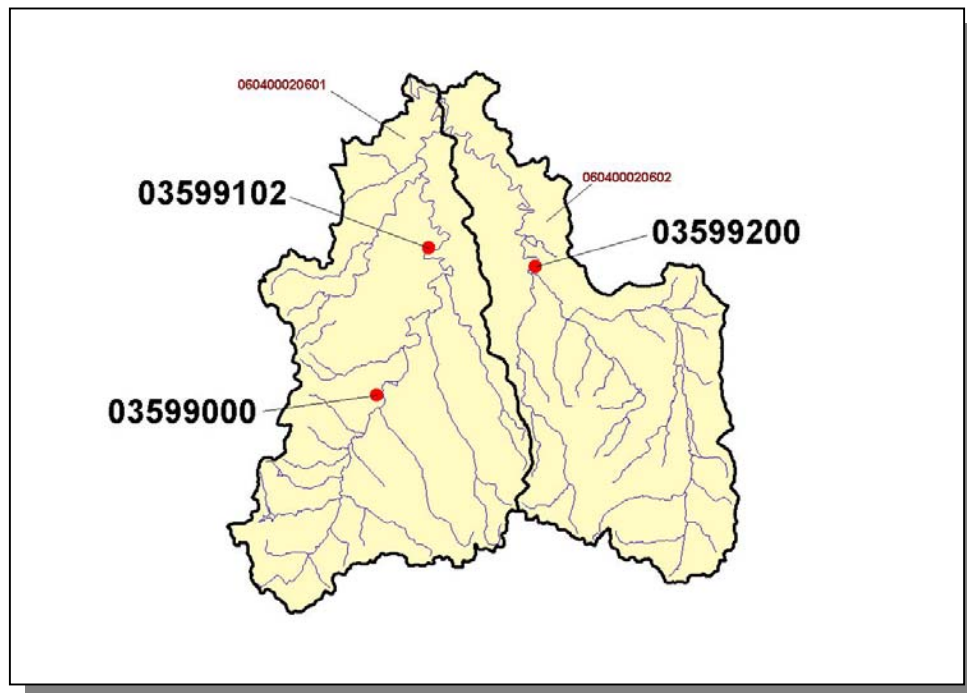
**Table 4-37. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0604000206.** More information is provided in Appendix IV.

| County        | COUNTY POPULATION |               |               | Portion of Watershed (%) | ESTIMATED POPULATION IN WATERSHED |              |              | % Change (1990-1997) |
|---------------|-------------------|---------------|---------------|--------------------------|-----------------------------------|--------------|--------------|----------------------|
|               | 1990              | 1997          | 2000          |                          | 1990                              | 1997         | 2000         |                      |
| Bedford       | 30,411            | 34,203        | 37,586        | 2.44                     | 741                               | 833          | 916          | 23.6                 |
| Marshall      | 21,539            | 25,687        | 26,767        | 29.89                    | 6,439                             | 7,679        | 8,002        | 24.3                 |
| <b>Totals</b> | <b>51,950</b>     | <b>59,890</b> | <b>64,353</b> |                          | <b>7,180</b>                      | <b>8,512</b> | <b>8,918</b> | <b>24.2</b>          |

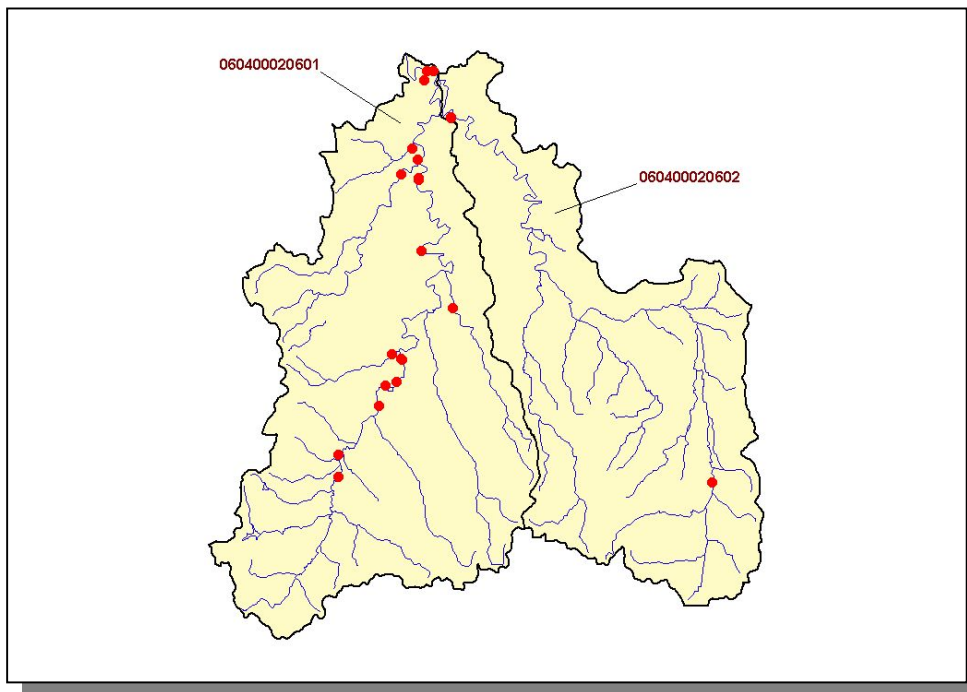
*Table 4-38. Population Estimates in Subwatershed 0604000206.*

| Populated Place | County   | Population    | NUMBER OF HOUSING UNITS |              |             |          |
|-----------------|----------|---------------|-------------------------|--------------|-------------|----------|
|                 |          |               | Total                   | Public Sewer | Septic Tank | Other    |
| Cornersville    | Marshall | 677           | 312                     | 54           | 255         | 3        |
| Lewisburg       | Marshall | 9,879         | 4,275                   | 3,990        | 285         | 0        |
| <b>Totals</b>   |          | <b>10,556</b> | <b>4,587</b>            | <b>4,044</b> | <b>540</b>  | <b>3</b> |

*Table 4-39. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 0604000206.*

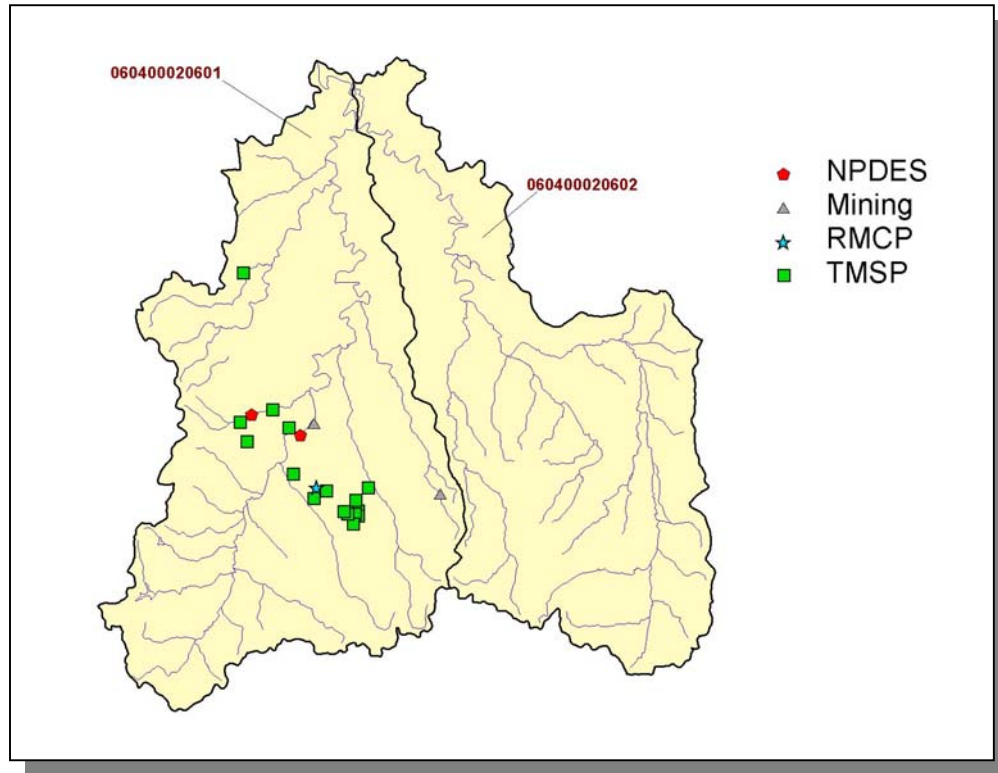


**Figure 4-66. Location of Historical Streamflow Data Collection Sites in Subwatershed 0604000206.** Subwatershed 060400020601 and 060400020602 boundaries are shown for reference. More information is provided in Appendix IV.



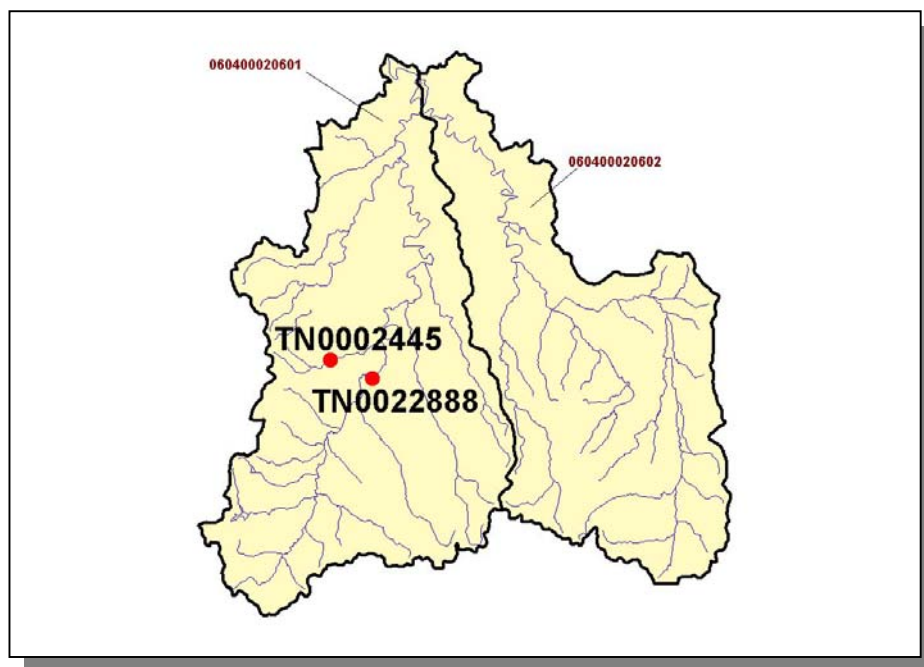
**Figure 4-67. Location of STORET Monitoring Sites in Subwatershed 0604000206.** Subwatershed 060400020601 and 060400020602 boundaries are shown for reference. More information, including site names and locations, is provided in Appendix IV.

4.2.F.ii. Point Source Contributions.

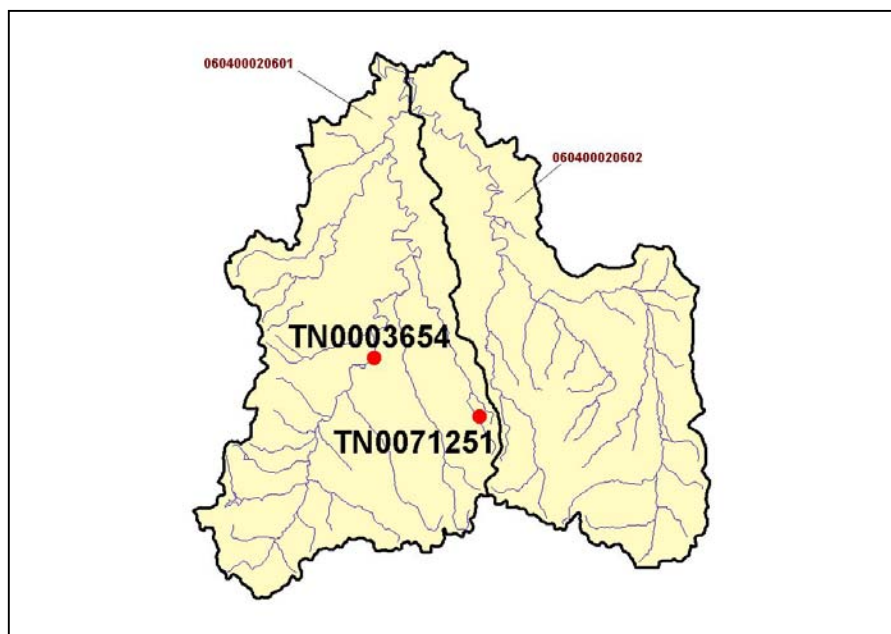


**Figure 4-68. Location of Active Point Source Facilities in Subwatershed 0604000206.** Subwatershed 060400020601 and 060400020602 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.

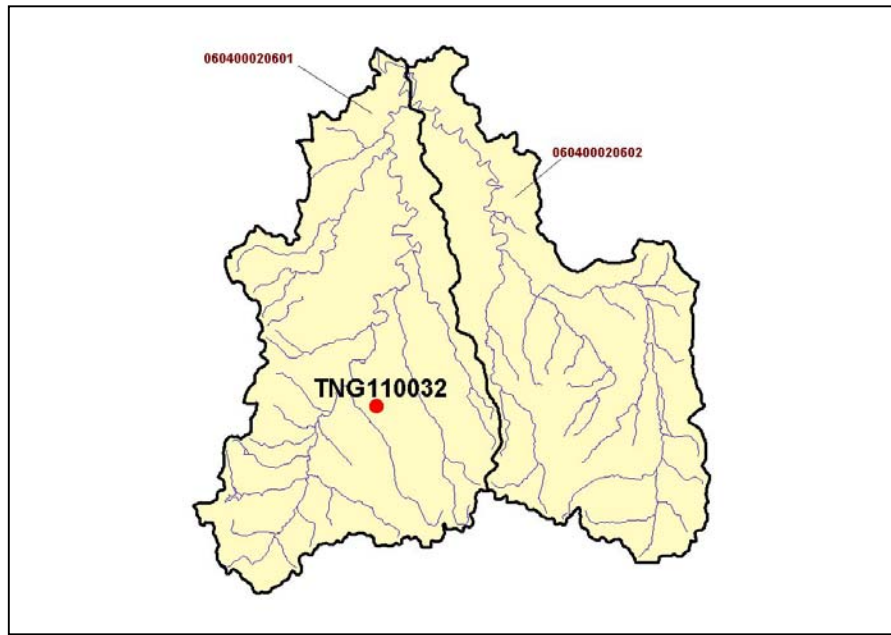




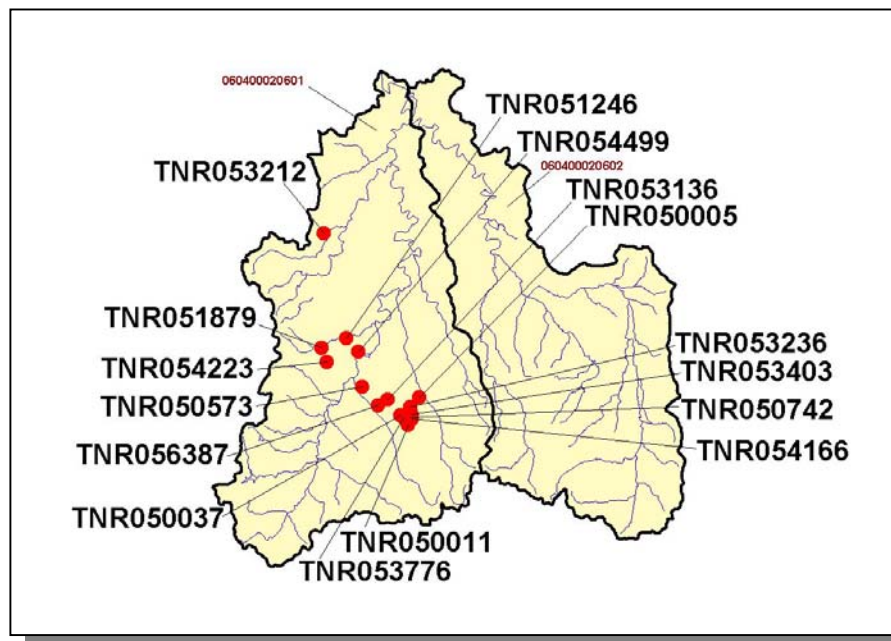
**Figure 4-69. Location of NPDES Facilities in Subwatershed 0604000206.** Subwatershed 060400020601 and 060400020602 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.



**Figure 4-70. Location of Active Mining Facilities in Subwatershed 0604000206.** Subwatershed 060400020601 and 060400020602 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.



**Figure 4-71. Location of Ready Mix Concrete Plants in Subwatershed 0604000206.** Subwatershed 060400020601 and 060400020602 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.

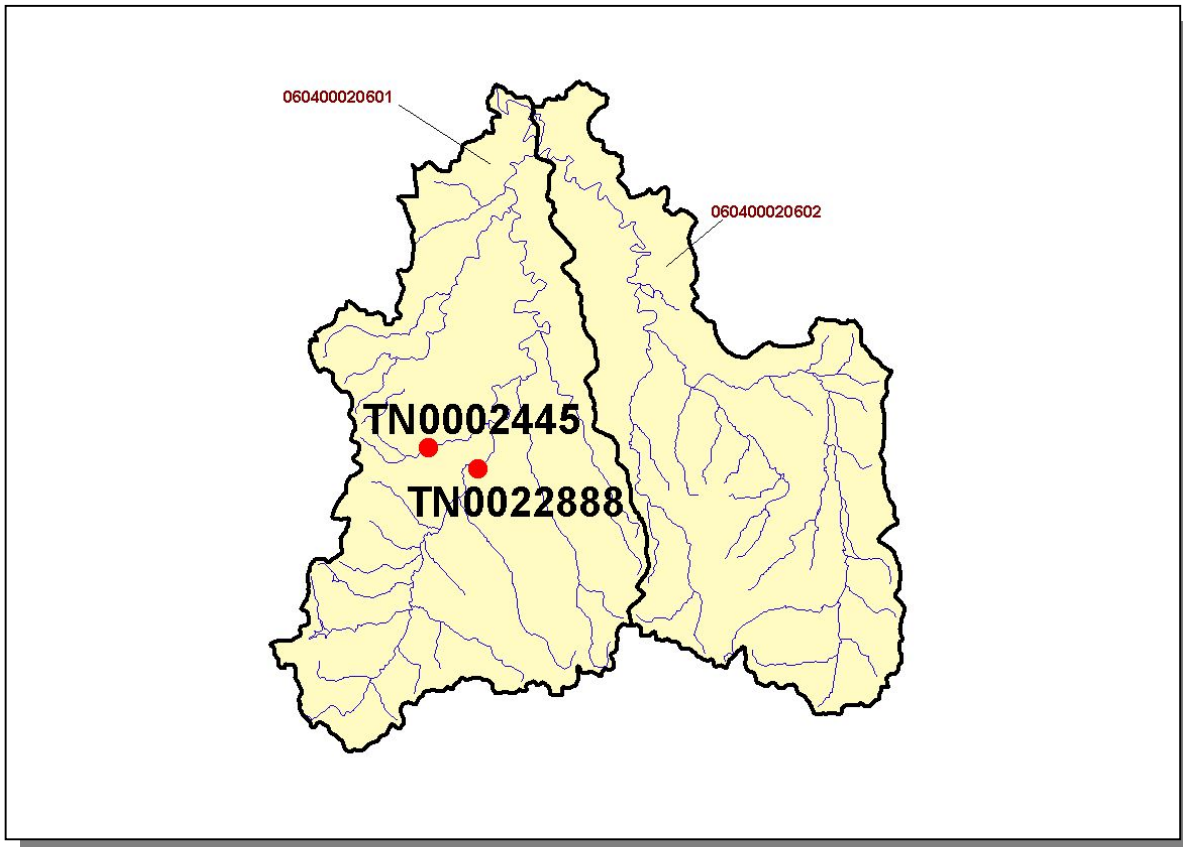


**Figure 4-72. Location of TMSP Facilities in Subwatershed 0604000206.** Subwatershed 060400020601 and 060400020602 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.

**4.2.F.ii.a. Dischargers to Water Bodies Listed on the 2002 303(d) List**

There are two NPDES facilities discharging to water bodies listed on the 2002 303(d) list in Subwatershed 0604000206:

- TN0022888 (Lewisburg STP) discharges to Big Rock Creek @ RM 16.8
- TN0002445 (International Comfort Products Corporation) discharges to Snell Branch @ RM 1.6 to Big Rock Creek @ RM 15.5



**Figure 4-73. Location of NPDES Dischargers to Water Bodies Listed on the 2002 303(d) List in Subwatershed 0604000206.** Subwatershed 060400020601 and 060400020602 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.

| PERMIT #  | 1Q10 | 3Q10 | 7Q10 | 3Q20 | QDESIGN |
|-----------|------|------|------|------|---------|
| TN0022888 | 0    | 0    | 0    | 0    | 3.024   |
| TN0002445 |      |      | 0    |      |         |

**Table 4-40. Receiving Stream Flow Information for NPDES Dischargers to Waterbodies Listed on the 2002 303(d) List in Subwatershed 0604000206.** Data are in million gallons per day (MGD). Data were obtained from the USGS publication Flow Duration and Low Flows of Tennessee Streams Through 1992 or from permit files.

| PERMIT #  | WET | CBOD <sub>5</sub> | FECAL COLIFORM | E. COLI | NH <sub>3</sub> | TRC | TSS | SETTLEABLE SOLIDS | DO | pH |
|-----------|-----|-------------------|----------------|---------|-----------------|-----|-----|-------------------|----|----|
| TN0022888 | X   | X                 | X              | X       | X               | X   | X   | X                 | X  | X  |
| TN0002445 | X   |                   |                |         |                 |     | X   |                   |    | X  |

**Table 4-41. Parameters Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2002 303(d) List in Subwatershed 0604000206.** WET, Whole Effluent Toxicity; CBOD<sub>5</sub>, Carbonaceous Biochemical Oxygen Demand (5-Day); TRC, Total Residual Chlorine; TSS, Total Suspended Solids.

| PERMIT #  | TRICHLOROETHYLENE | 1,1-DICHLOROETHYLENE |
|-----------|-------------------|----------------------|
| TN0002445 | X                 | X                    |

**Table 4-42. Organic Parameters Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2002 303(d) List in Subwatershed 0604000206.**

**4.2.F.iii. Nonpoint Source Contributions.**

| <b>LIVESTOCK (COUNTS)</b> |          |        |                   |                          |       |       |
|---------------------------|----------|--------|-------------------|--------------------------|-------|-------|
| Beef Cow                  | Milk Cow | Cattle | Chickens (Layers) | Chickens (Broilers Sold) | Hogs  | Sheep |
| 5,739                     | 1,369    | 12,910 | 17                | 546,037                  | 1,161 | 70    |

**Table 4-43. Summary of Livestock Count Estimates in Subwatershed 0604000206.** According to the 1997 Census of Agriculture (<http://www.nass.usda.gov/census/>), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.

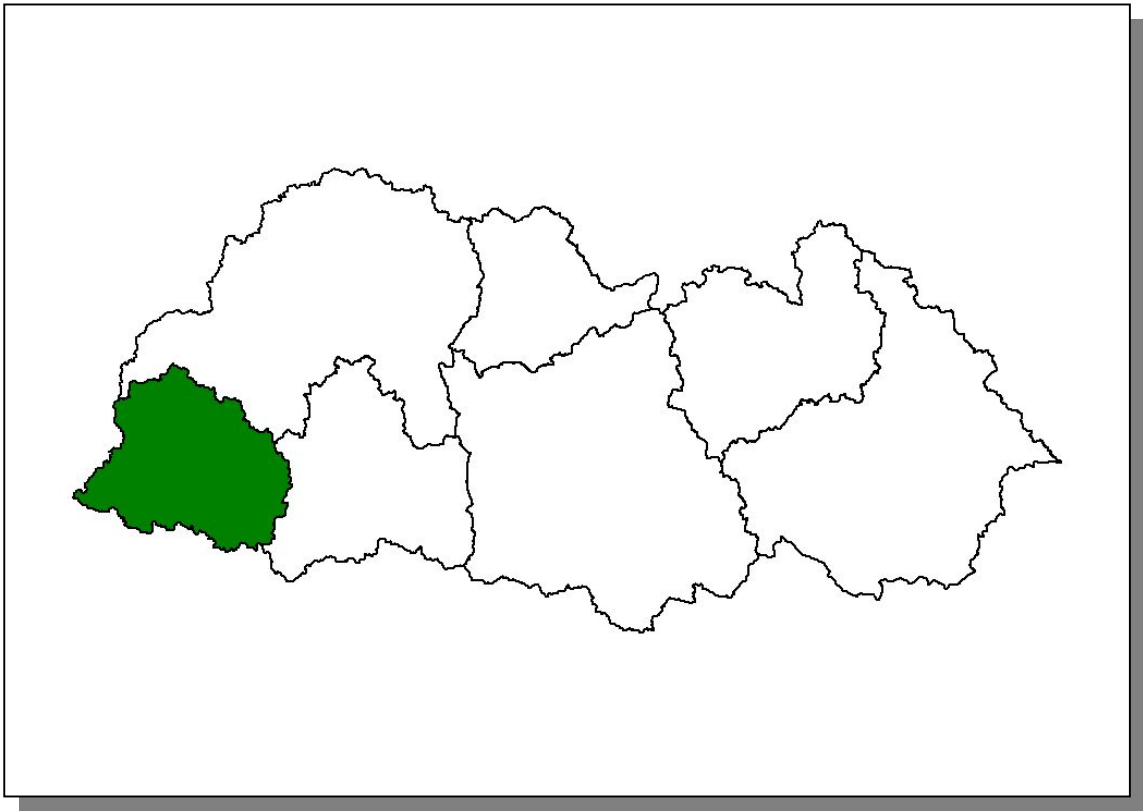
| County  | <b>INVENTORY</b>                |                                 | <b>REMOVAL RATE</b>                   |                                   |
|---------|---------------------------------|---------------------------------|---------------------------------------|-----------------------------------|
|         | Forest Land<br>(thousand acres) | Timber Land<br>(thousand acres) | Growing Stock<br>(million cubic feet) | Sawtimber<br>(million board feet) |
| Bedford | 74.6                            | 74.6                            | 0.5                                   | 1.3                               |

**Table 4-44. Forest Acreage and Average Annual Removal Rates (1987-1994) in Subwatershed 0604000206.**

| <b>CROPS</b>                          | <b>TONS/ACRE/YEAR</b> |
|---------------------------------------|-----------------------|
| Grass (Pastureland)                   | 0.75                  |
| Grass (Hayland)                       | 0.43                  |
| Legumes (Hayland)                     | 0.59                  |
| Legumes, Grass (Hayland)              | 2.24                  |
| Grass, Forbs, Legumes (Mixed Pasture) | 0.62                  |
| Forest Land (Not Grazed)              | 0.00                  |
| Forest Land (Grazed)                  | 0.00                  |
| Corn (Row Crops)                      | 8.91                  |
| Soybeans (Row Crops)                  | 5.66                  |
| Wheat (Close-Grown Cropland)          | 7.54                  |
| Summer Fallow (Other Cropland)        | 8.36                  |
| Other Cropland not Planted            | 0.23                  |
| Conservation Reserve Program Lands    | 0.18                  |
| Non-Agricultural Land Use             | 0.00                  |
| Other Land in Farms                   | 0.05                  |
| Farmsteads and Ranch Headquarters     | 0.04                  |

**Table 4-45. Annual Estimated Total Soil Loss in Subwatershed 0604000206.**

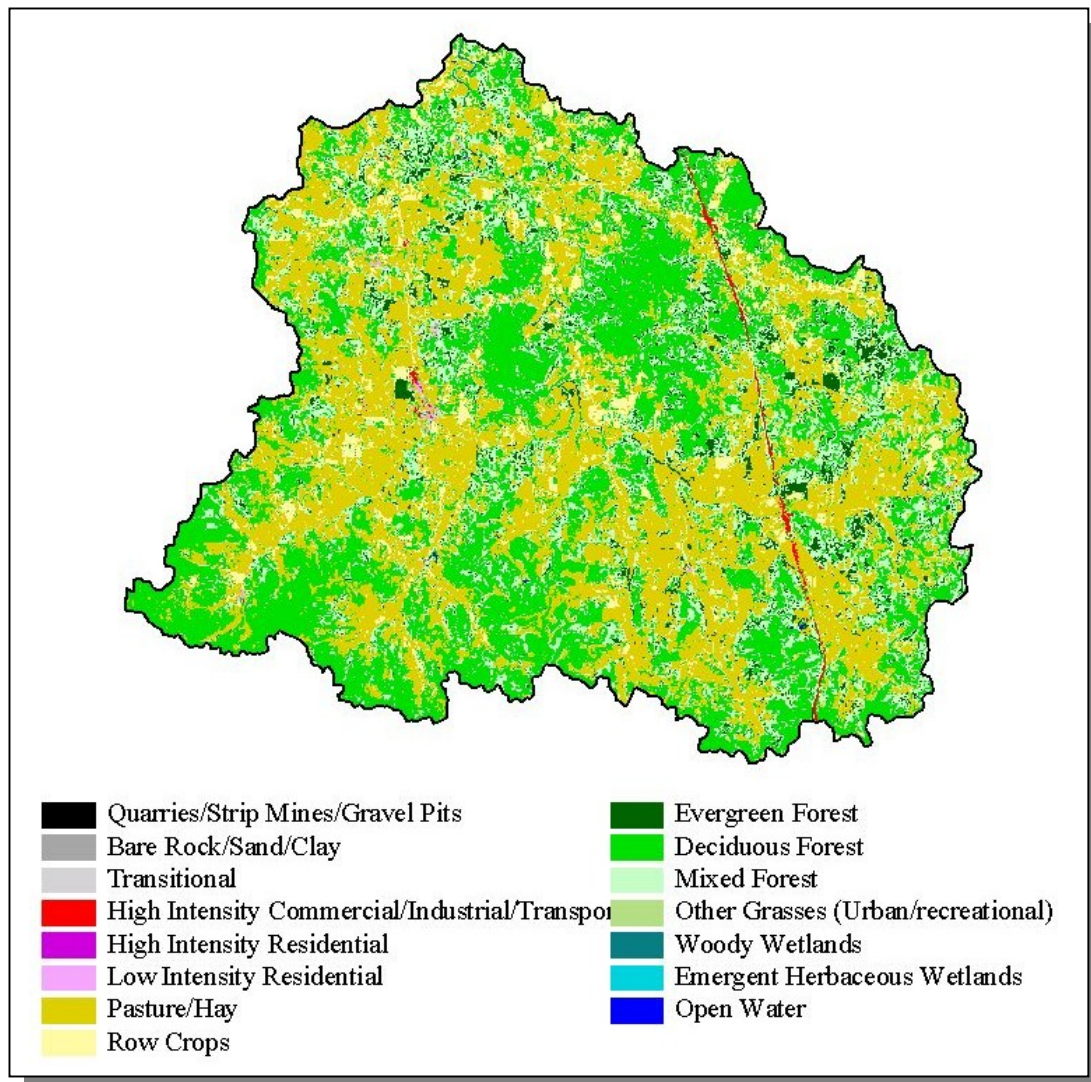
**4.2.G. 0604000207 (Silver Creek).**



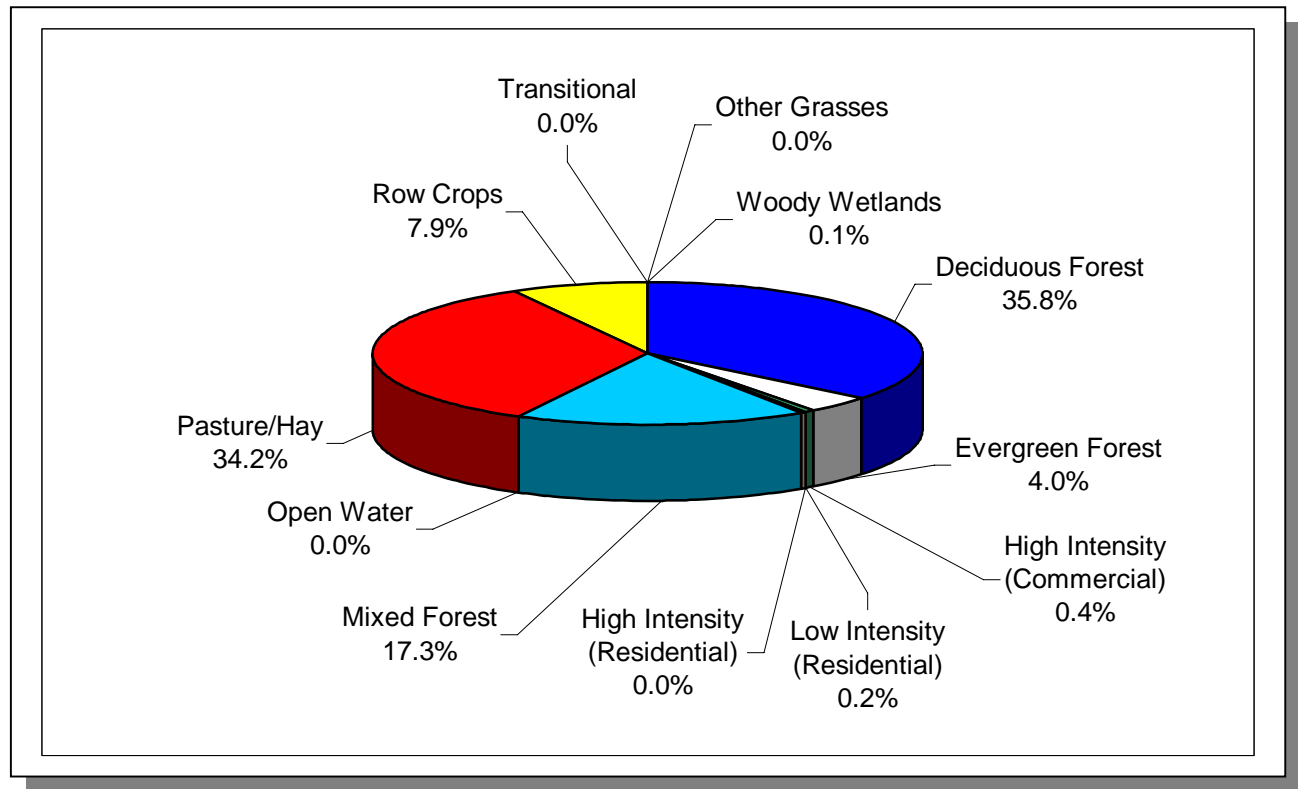
**Figure 4-74. Location of Subwatershed 0604000207.** All Upper Duck HUC-10 subwatershed boundaries are shown for reference.



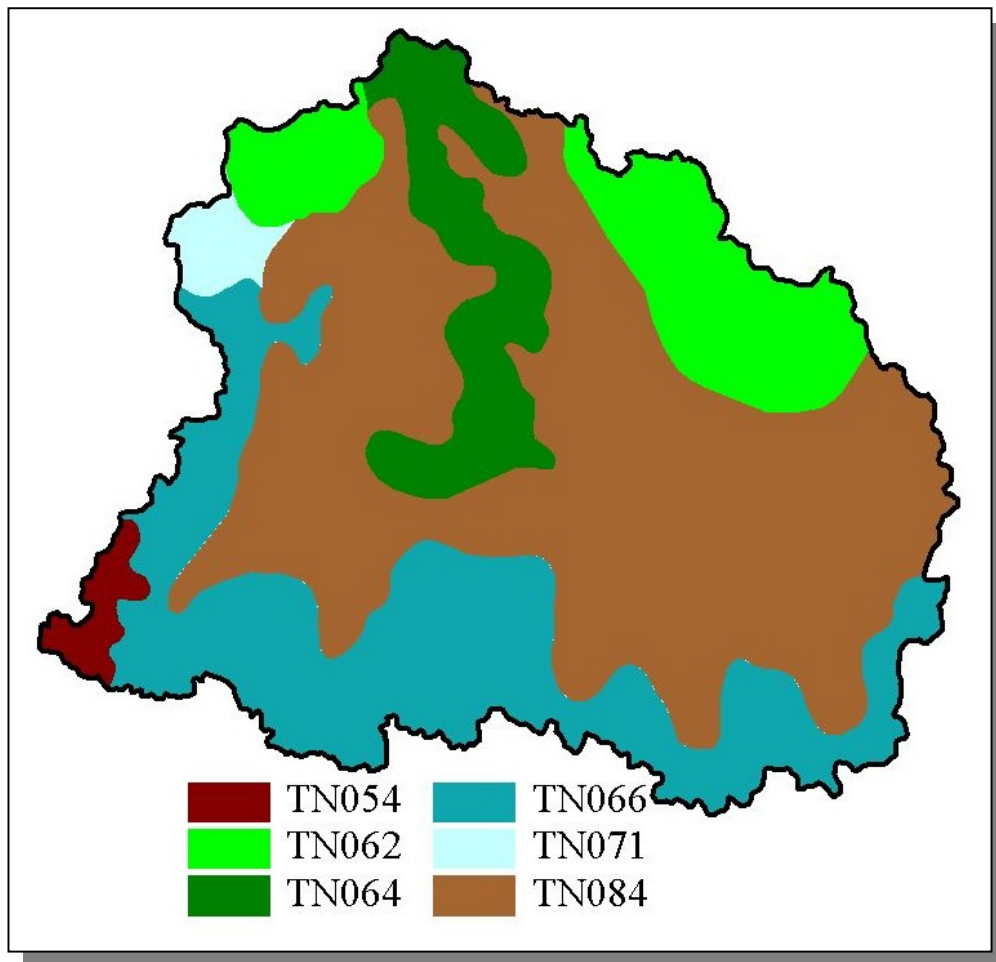
4.2.G.i. General Description.



*Figure 4-75. Illustration of Land Use Distribution in Subwatershed 0604000207.*



**Figure 4-76. Land Use Distribution in Subwatershed 0604000207.** More information is provided in Appendix IV.



**Figure 4-77. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0604000207.**

| STATSGO<br>MAP UNIT ID | PERCENT<br>HYDRIC | HYDROLOGI<br>C GROUP | PERMEABILITY<br>(in/hr) | SOIL<br>pH | ESTIMATED<br>SOIL TEXTURE | SOIL<br>ERODIBILITY |
|------------------------|-------------------|----------------------|-------------------------|------------|---------------------------|---------------------|
| TN054                  | 0.00              | C                    | 3.04                    | 4.84       | Loam                      | 0.32                |
| TN062                  | 0.00              | C                    | 0.98                    | 4.40       | Clayey Loam               | 0.26                |
| TN064                  | 7.00              | C                    | 1.19                    | 5.82       | Silty Loam                | 0.37                |
| TN066                  | 0.00              | B                    | 2.62                    | 4.75       | Loam                      | 0.28                |
| TN071                  | 0.00              | C                    | 2.37                    | 5.70       | Silty Loam                | 0.33                |
| TN084                  | 0.00              | C                    | 1.80                    | 4.99       | Silty Loam                | 0.28                |

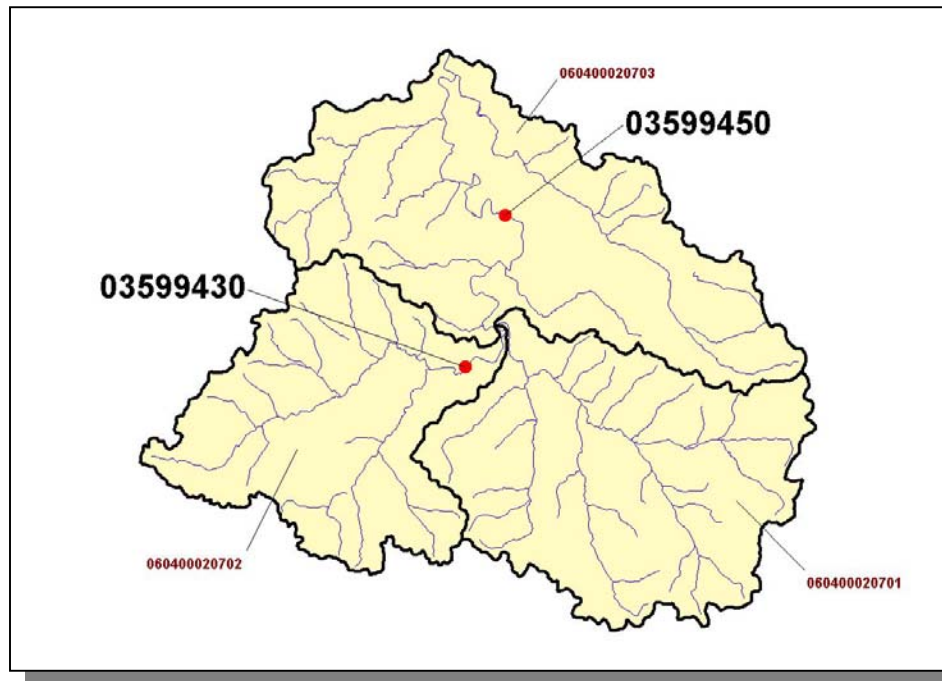
**Table 4-46. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0604000207.** More information is provided in Appendix IV.

| County        | COUNTY POPULATION |                |                | Portion of Watershed (%) | ESTIMATED POPULATION IN WATERSHED |              |              | % Change (1990-1997) |
|---------------|-------------------|----------------|----------------|--------------------------|-----------------------------------|--------------|--------------|----------------------|
|               | 1990              | 1997           | 2000           |                          | 1990                              | 1997         | 2000         |                      |
| Giles         | 25,741            | 28,515         | 29,447         | 1.3                      | 334                               | 370          | 382          | 14.4                 |
| Marshall      | 21,539            | 25,687         | 26,767         | 9.43                     | 2,031                             | 2,423        | 2,525        | 24.3                 |
| Maury         | 54,812            | 68,268         | 69,498         | 9.82                     | 5,385                             | 6,707        | 6,828        | 26.8                 |
| <b>Totals</b> | <b>102,092</b>    | <b>122,470</b> | <b>125,712</b> |                          | <b>7,750</b>                      | <b>9,500</b> | <b>9,735</b> | <b>25.6</b>          |

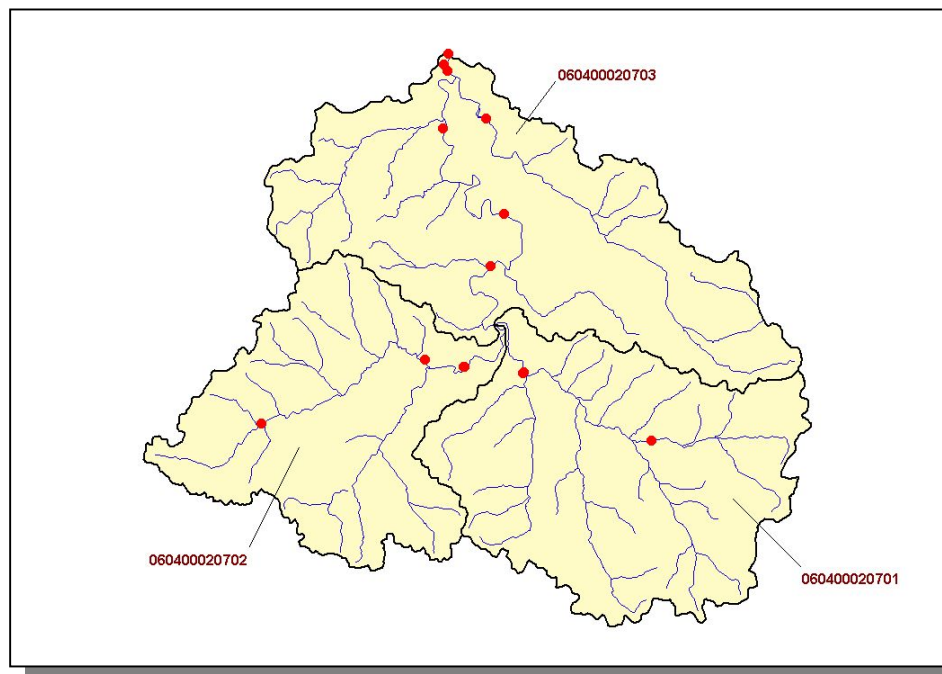
*Table 4-47. Population Estimates in Subwatershed 0604000207.*

| NUMBER OF HOUSING UNITS |          |            |       |              |             |       |
|-------------------------|----------|------------|-------|--------------|-------------|-------|
| Populated Place         | County   | Population | Total | Public Sewer | Septic Tank | Other |
| Lewisburg               | Marshall | 9,879      | 4,275 | 3,990        | 285         | 0     |

*Table 4-48. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 0604000207.*

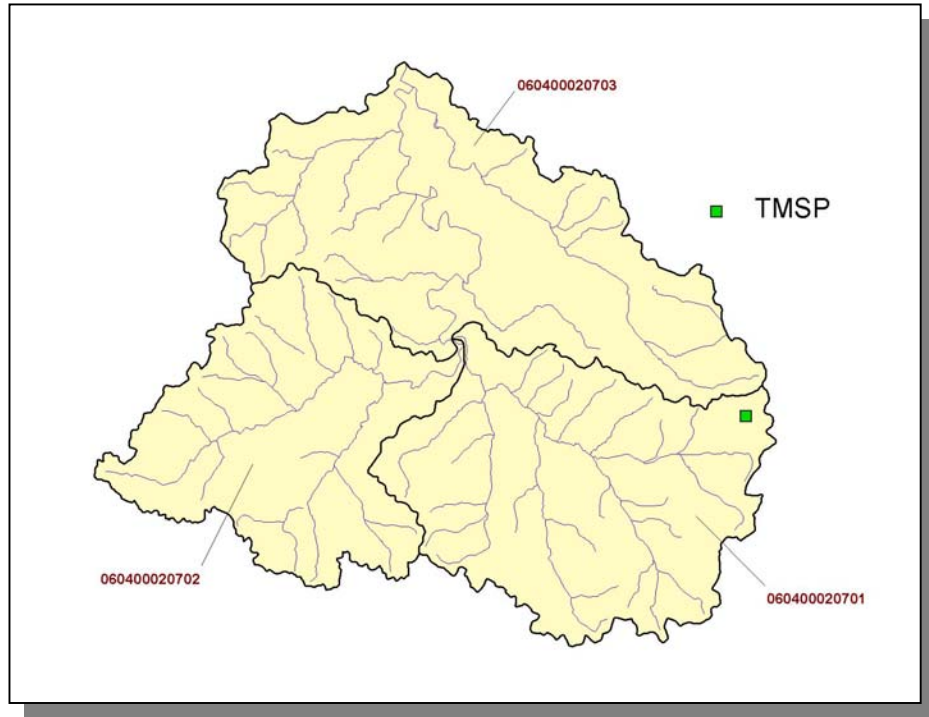


**Figure 4-78. Location of Historical Streamflow Data Collection Sites in Subwatershed 0604000207.** Subwatershed 060400020701, 060400020702, and 060400020703 boundaries are shown for reference. More information, including site names and locations, is provided in Appendix IV.



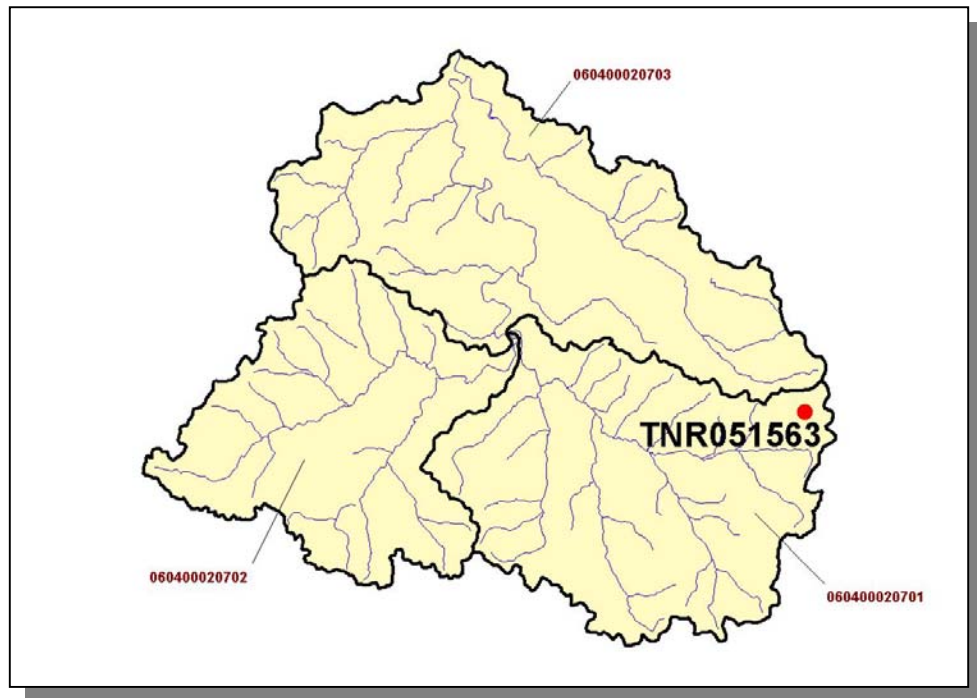
**Figure 4-79. Location of STORET Monitoring Sites in Subwatershed 0604000207.** Subwatershed 060400020701, 060400020702, and 060400020703 boundaries are shown for reference. More information, including site names and locations, is provided in Appendix IV.

**4.2.G.ii.** Point Source Contributions.



**Figure 4-80. Location of Active Point Source Facilities in Subwatershed 0604000207.** Subwatershed 060400020701, 060400020702, and 060400020703 boundaries are shown for reference. More information is provided in Appendix IV.





**Figure 4-81. Location of TMSF Facilities in Subwatershed 0604000207.** Subwatershed 060400020701, 060400020702, and 060400020703 boundaries are shown for reference. More information is provided in Appendix IV.

**4.2.G.iii.** Nonpoint Source Contributions.

| <b>LIVESTOCK (COUNTS)</b> |        |          |                   |                          |      |       |
|---------------------------|--------|----------|-------------------|--------------------------|------|-------|
| Beef Cow                  | Cattle | Milk Cow | Chickens (Layers) | Chickens (Broilers Sold) | Hogs | Sheep |
| 8,046                     | 17,189 | 1,115    | 22                | <5                       | 898  | 94    |

**Table 4-49. Summary of Livestock Count Estimates in Subwatershed 0604000207.**  
According to the 1997 Census of Agriculture (<http://www.nass.usda.gov/census/>), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.

| County | <b>INVENTORY</b>                |                                 | <b>REMOVAL RATE</b>                   |                                   |
|--------|---------------------------------|---------------------------------|---------------------------------------|-----------------------------------|
|        | Forest Land<br>(thousand acres) | Timber Land<br>(thousand acres) | Growing Stock<br>(million cubic feet) | Sawtimber<br>(million board feet) |
| Giles  | 171.8                           | 171.8                           | 3.3                                   | 11.4                              |

**Table 4-50. Forest Acreage and Average Removal Rates (1987-1994) in Subwatershed 0604000207.**

| <b>CROPS</b>                          | <b>TONS/ACRE/YEAR</b> |
|---------------------------------------|-----------------------|
| Grass (Pastureland)                   | 0.73                  |
| Grass (Hayland)                       | 0.32                  |
| Legumes (Hayland)                     | 0.59                  |
| Legumes, Grass (Hayland)              | 0.99                  |
| Grass, Forbs, Legumes (Mixed Pasture) | 0.43                  |
| Forest Land (Not Grazed)              | 0.00                  |
| Forest Land (Grazed)                  | 0.00                  |
| Corn (Row Crops)                      | 6.24                  |
| Soybeans (Row Crops)                  | 6.86                  |
| All Other Row Crops                   | 10.41                 |
| Barley (Close-Grown Cropland)         | 1.08                  |
| Summer Fallow (Other Cropland)        | 7.16                  |
| Other Cropland not Planted            | 2.69                  |
| Other Vegetable and Truck Crop        | 4.29                  |
| Conservation Reserve Program Lands    | 0.34                  |
| Non-Agricultural Land Use             | 0.00                  |
| Other Land in Farms                   | 0.05                  |
| Farmsteads and Ranch Headquarters     | 0.29                  |

**Table 4-51. Annual Estimated Total Soil Loss in Subwatershed 0604000207.**